THE IRON TRADE REVIEW

VOLUME XXXIX CLEVELAND, JANUARY 18, 1906 NUMBER 3

STRONG FACTORS

OF LAST YEAR ARE WELL MAINTAINED

While There Are New Elements of Prosperity—Some Weakness in Pig Iron at Chicago.

Business conditions are considerably stronger than they were one year ago, although at that time there was a general belief, which proved to be well founded, that 1905 would be a record breaking year. The factors which 12 months ago kept the immediate situation from meeting every expectation were: continued withholding of rail orders, the fact that trade with jobbers was not as active as with mills and the lagging of orders with jobbing foundries. The orders for rails within a few months have been unprecedented, being nearly equal to the expected production for 1906; jobbers are doing an excellent business and the foundries have never been more prosperous. At the same time all of the strong factors of the situation in January, 1905, are in evidence to a greater extent than they were at that time. Hence, the slight decrease in demand in some lines causes no alarm.

During the past week the Chicago pig iron market, which had been remarkable for its great strength for several months, has shown some indications of weakness. Although sales of southern iron on the basis of $14.00, Birmingham, had been frequent in other centers, the $14.50 basis had been well maintained in Chicago. Within a few days, however, offerings of southern iron were made at Chicago on a basis of $14.00. This change may be taken as an indication that the Chicago market is approaching more nearly conditions in other parts of the country, rather than that there is any general weakness. In other sections, while buying has not been very heavy, there has been a fair demand. In New York about 50,000 tons, of which one-half was foundry iron, has been disposed of, while in Cleveland sales approached 30,000 tons. The demand for basic in the east has exhausted the supply well into the first half of the year, but at present it is not so strong and in Pittsburg also the demand shows some diminution. The United States Steel Corporation has purchased 60,000 tons of Bessemer for the first quarter of 1906. When it is recalled that at the beginning of 1904 pig iron was being produced at the rate of only 10,000,000 tons per year, that in January, 1905, the production was at the rate of 19,000,000 tons, and that at present the rate is about 24,000,000 tons, it is not surprising to find that, in some sections at least, the production is fully meeting the demand, but the blowing out of blast furnaces for repairs continues, and there is no danger for excess of production. Conservative observers expect, however, that buyers will be rather cautious and will not place orders for large tonnages until the market develops a more decided tendency.

The heavy orders for cars recently placed have checked the downward tendency of bar iron, but the prices are still rather irregular. During the first two months of last year there was a sharp decline in bar iron, when prices of nearly all other products were firm, and a similar experience this year would be far from indicating the passing of prosperity.

The sheet situation is unusually strong. The recently advanced prices are being uniformly maintained, and there is no disposition of independent interests to shade quotations.

Heavy buying of bridge material by the railroads has included 17,000 tons by the Tide Water Railroad, 1,400 tons for the Lake Shore and 7,200 tons for other lines. Considerable buying has also been done for new railroad shops. The scarcity of spikes and track bolts has resulted in sharp advances in quotations. Specifications for merchant steel are very heavy.

The demand for wire products continues very strong, and mills are falling further behind in their deliveries.

The continuance of mild weather in nearly all parts of the country has tended to force prices of coke and scrap downward. Foundry coke is now selling at $3.25 to $3.50, and furnace at $2.40 to $2.65.

PIG IRON DULL

And Concession Does not Result in New Orders — Late Chicago News.

Chicago, Jan. 17.—Trading in iron and steel products is of a perfunctory nature. Pig iron is slow in developing the expected strength and a concession of 50 cents a ton last week in southern foundry grades failed to arouse any demand. The buyoyancy that was so strong a feature last month has entirely disappeared, and the market today is flat and uninteresting. There is an abundance of specifications for all forms of finished material, but in new tonnage trading is disappointingly small. This condition is most pronounced in those products controlled by the Corporation, whose western plants some weeks ago withdrew from the market. All inquiries for rails, plates and structural shapes are turned over to the Carnegie Steel Co. for attention, while new tonnage for spikes and bolts is declined because of the oversold condition of the Illinois mills. Prices of these two materials have sharply advanced since their scarcity became evident, and spikes are now quoted at 2.10c Chicago, and track bolts, 3c plus extras. The advances in sheets and wire last week are uniformly maintained by independent western makers. Demand for both is excellent. Bar iron continues soft, and 1.82½c is the local quotation. The large orders for railroad cars that have been placed recently, together with the undelivered thousands on the books of car builders, constitute an anchor of strength for this product, and prices are not expected to remain low very long. The scrap market which has been soft for some time hardened today with the first fall of snow in several weeks.

STEEL RAIL SALES.

New York, Jan. 17.—Among the rail sales announced are, Pennsylvania, 20,000 additional, making total 200,000; Gould Lines, 10,000 additional; Syracuse Railroad 5,000; scattering orders 10,000 to 15,000.

Hic Jacet Pace.—Notices have been received that the Western Pig Iron Association has been dissolved and its reports will be discontinued. The inability to obtain reports from furnaces is given as the cause. It found that its attempt to interfere with the collection of statistics by trade journals was a death dealing boomerang.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Details of Bessemer Sale.—Many Improvements and New Plants.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, January 17.

Conditions generally during the past week have been comparatively quiet. The only real flurry was the purchase by the United States Steel Corporation of 60,000 tons of Bessemer pig iron for first quarter delivery at $17.25, valley furnaces. This purchase will nearly clean up first quarter Bessemer and the market on comparatively small lots is now $17.75. It is expected that within a short time the corporation will open negotiations for second quarter iron. With the heavy business which has been done and the apparent scarcity of Bessemer iron it has been surprising to note the even tenor of the market. There have been no sharp advances and the aim of all interested has been to maintain a strong condition without boom features and they have so far succeeded remarkably well. Of the Steel Corporation purchase 25,000 tons was from W. P. Snyder & Co. and 35,000 tons from the Bessemer association.

The demand for foundry and malleable iron has been very heavy and a close second to Bessemer, but basic has not held its own in the march and during the past two weeks may be said to have been weak. Southern iron is quoted at $14.50, Birmingham; many of the agencies for southern furnaces have been instructed to supply old customers but not to seek new trade. With the advance of 25 cents per ton on southern iron to points north of the Ohio river going into effect March 1, the southern product will be under a new disadvantage. Gray forge is quoted at $16.25, furnace, or $17.10, Pittsburg, and several furnaces are holding strong for $18 valley on No. 2 northern. Foundry iron has been selling freely.

In the finished lines there has been but little change during the week, the conditions being such that not much of a change is possible. A heavy building movement is expected in the spring and jobbers are preparing for it. Last year many building projects were delayed on account of inability to secure material, but better things are looked for with the opening of the spring this year.

Improvements, modernization and extensions are now being rushed by many of the large interests as well as the smaller concerns. The work of installing the additions to the Homestead plant of the Carnegie Steel Co., has been started, and ground has already been cleared for a part of the work, which will be rushed as rapidly as possible, as the new capacity is badly needed and records will probably be made in the erection of the new works.

While officials of the Crucible Steel Co. of America refuse to make a statement regarding their plans, it is reported upon apparently good authority that it has decided to erect a new plant at Thirty-sixth street and the Allegheny Valley railroad, this plant to contain a large number of puddling furnaces and, aside from other equipment, have two sets of plate mill rolls. That the company will soon erect a plant for the manufacture of railway springs and kindred products, is also reported.

The new plant of the Pennsylvania Swedish Iron Co., at Cheswick, Pa., on the West Penn division of the Pennsylvania railroad, 14½ miles from Pittsburg will start its bloom forging department this week and expects to have a capacity of 500 tons per month. The remainder of the plant for the production of charcoal, boiler tube, skelp iron, scrap bars, low phosphorus bars, high grade merchant bars and stay bolt iron will be completed and in operation about March 15. A plate mill to make charcoal plates will also be included.

Scrap and coke prices have been soft during the past week and the embargoes placed by railroads on several plants have stopped shipments.

Pig Iron.—The heavy sales of Bessemer pig iron since the first of the new year have created a marked scarcity in this particular line although no figures are obtainable relating to stocks on hand or furnace production. It is pretty generally understood, however, that the furnaces are practically sold up for first quarter delivery and that negotiations will soon be opened for a large sale of second quarter iron. The efforts of the leading interest to maintain a steady and strong market and eliminate all runaway features has to date been eminently successful. Bessemer for first quarter delivery in small lots is now quoted at $17.75 although this might be shaded on a large tonnage by some furnaces which have not sold up or by brokers with stocks on hand. Foundry iron has in strength of price kept pace with Bessemer, but basic has been weaker. Southern No. 2 grade is quoted at $14.50, Birmingham. The advance in freight rate to points north of the Ohio river, effective March 1 will be a serious matter for southern furnaces in a competitive market. We quote:

Bessemer Valley	$17.60 to 17.75
Bessemer, Pittsburg	18.45 to 18.60
No. 1 Foundry, Pittsburg	19.00 to 19.25
No. 2 Foundry, Pittsburg	18.75 to 19.00
Gray Forge, Pittsburg	17.10 to 17.60
Basic, Valley	17.25 to 17.50
Basic, Pittsburg	18.10 to 18.35

Ferro-Manganese.—The situation in regard to ferro-manganese does not appear to be as bad as it was two weeks ago, although there is but little to be had. The leading importers have been receiving small lots which are being distributed, but sales at $175 per ton have been reported. Sales of a few tons are much more frequent than carload lots and on future contracts for the second half of the year no guarantee is given, although contracts have been signed on an $85 base.

Skelp.—Although the pipe mills have been busy there has been but little activity in skelp in the market and prices quoted are nominal and without change: Bessemer, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron, grooved, 1.65c to 1.70c; sheared, 1.80c.

Muck Bar.—A nominal quotation of $31 is made, although there have been no transactions upon which to base a price.

Merchant Steel.—The principal tool steel interests continue to book heavy contracts for new tonnage and the situation in this market is extremely good. Although no official announcement of an advance in price has been made, there has been a premium list running $2 to $3 per ton on the leading lines and it has been almost universally secured.

Billets.—The scarcity of billets has caused another advance and Bessemer billets are now quoted at $27.50, strong and open-hearth billets at $28.50. Only a few of the larger concerns are offering any for sale, the major part of the makers being entirely out of the market having closed for their entire output or are using them for their own consumption.

Sheets and Tin Plate.—The South Sharon tin mill of the American Sheet & Tin Plate Co., will resume operations next Monday to full capacity after being idle since early last summer, since which time extensive alterations and improvements have been made. The American Sheet & Tin Plate Co., during the coming year will make quite extensive improvements on several of its plants in the way of modernizing the equipment which has become out of date in one or two cases. A new open-hearth furnace will be added at Vandergrift. Business with the leading interest and the independents has been very heavy at the advanced prices and an unusually high

percentage of mills is in operation although there has been considerable complaint that the high price of raw material leaves but a small margin of profit. One independent concern which recently constructed a new mill has not begun operations on account of the high price of raw material, which was not anticipated. We continue to quote.

American Bessemer steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2c; Nos. 13-14, 2.05c; Nos. 15-16, 2.10c; Nos. 17-21, 2.15c; Nos. 22-24, 2.20c; Nos. 25-26, 2.25c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c. Corrugated roofings, 1.70c per square for No. 28 painted, 2½-inch corrugation; 3.05 per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Pipes and Tubes.—The National Tube Co., on Jan. 1, discontinued all quotations on iron pipe and one or two of the independent makers have done the same thing, and are now quoting on iron pipe only when they are compelled to do so to satisfy old customers. Pipe makers are well satisfied with the situation and are comfortably filled up with business. We quote:

	Steel		Iron	
Consumer's Carloads	Black	Galv.	Black	Galv.
⅛ and ¼ inch	71	55	67½	51½
⅜ inch	73	59	69½	55½
½ inch	75	63	71½	59½
¾ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55½
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48½
½ to 4 inches	71	59	67½	55½
4½ to 8 inches	67	55	63½	51½
Double extra strong plain ends, ½ to 8 inches	60	49	74½	48½

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel	Iron
1 to 1½ inches	46	41
1¾ to 2¼ inches	58	41
2½ inches	60	46
2¾ to 5 inches	66	53
6 to 13 inches	58	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Merchant Bars.—While the leading interests are still holding to their card quotations of 2.05c, Pittsburg on bar iron it is understood a lower price by one or two of the smaller interests has resulted in some business being done, although for a small tonnage. We continue to quote:

Common iron bars, 2c, Youngstown; 2.05c, Pittsburg; hoops, 1.85c in carload lots, and 1.95c in less than carload lots, with regular hoop card for extras. Bands, 1.50c; Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 1.50c, net; channels, angles, zees and tees under 3 inches, 1.60c all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 10c advance; less than 1,000 pounds of a size, 30c advance.

Wire and Wire Nails.—A large tonnage has been booked by both the leading interest and independent plants since the advance made the first of last week and conditions in wire and wire products are highly satisfactory. The two rod mills of the American Steel & Wire Co., at Sharon were put on double turn last Monday night after an idleness of several weeks.

We quote: Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carloads, $2; painted barb wire $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire $1.70 to jobbers and $1.75 by carload.

Rods.—We continue to quote a nominal price of $37 to $38 on rods. This commodity is very scarce and the transactions have been very few on this account.

Structural Material.—New tonnage contracts have been coming in as heavily as ever and during the past week there has been a heavy business in shapes and plates. Indications point to big building work as soon as spring opens. Contracts for the new Union National Bank building, Pittsburg, and the Commercial National Bank building, Chicago, will likely be placed within a short time. Last year poor delivery held back many projects, but from the present outlook it is thought there will be enough in stocks by jobbers to supply most of the demands, in connection with what can be secured from the mills. We continue to quote:

Beams and channels, 15 inches and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c, 1.75c; angles, from 3 to 8 inches, inclusive, 1.70c; universal and sheared plate, 6¼ inch and wider, 1.60c, base.

Plates.—The business in this market continues to be good and deliveries are considerably behind with no immediate prospects of catching up. The inadequate supply of semi-finished steel continues to some extent to hamper output but indications are that this will not be of long duration.

We continue to quote: Tank plate ¼ inch thick, 6¼ inch to 100 inches, 1.60c, f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds: Flange and boiler steel, 10c; marine, A. B. M. A. and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 inches up to 110 inches in width, not less than 5c extra; plates 110 inches to 115 inches wide, not less than 10c extra; 115 to 120 inches, not less than 15c extra; plates 120 inches to 125 inches wide, not less than 25c extra; plates 125 inches to 130 inches, not less than 50c extra; plates 130 inches wide, not less than $1 extra; plates 3-16 inch thick, 10c extra; gauges 7 and 8, 15 cents extra; No. 9, 25c extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except Pacific coast.

Rails and Track Material.—Demands for standard sections continue and during the week past contracts have been closed in this district for between 12,000 and 15,000 tons, 5,000 tons of which went to the Gould lines. The activity in light rails continues, but anticipate catching up shortly after Feb. 1. We continue to quote: Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50 to $29; 25 to 45 pounds, $28; angle bars for standard sections, 1.50c; spikes, $2.

Old Material.—The Sharon Steel Hoop Co., during the week bought a large tonnage of melting stock for delivery up to June 1. Steel scrap seems to be softening a little and as an indication we cite the sale by the Pennsylvania company of a tonnage at a figure above $18 and since that time dealers have been able to buy at $1 less. The weather conditions seem to be holding things down in this market and several of the large buyers have embargoes on their plants. The embargo was placed on La Belle at Steubenville, this week. The stock taking period is over and all seem to be playing safe and know exactly where they are. This does not mean that there are indications of the bottom going to drop out but is the result of natural conditions. We quote:

Heavy melting stock, $16.75 to $17.25; old steel rails, long lengths, $18 to $18.50; No. 1 cast scrap, $15 to $15.50; heavy cast scrap borings, $10.50 to $10.75; bundled sheet scrap, $15.50 to $15.75; No. 1 wrought scrap, $20.50 to $21; low phosphorus scrap, $20 to $21.

Coke.—The coke market for various reasons has softened considerably within the past few days and for spot delivery $3.25 to $3.50 can be handily done on foundry and from $2.40 to $2.65 on furnace coke. In several instances several carload lots of foundry coke have been let go at lower prices because it had been loaded and could not be disposed of and railroads refused more cars until it was out of the way. General reports on foundry coke are to the effect that foundrymen, anticipating a hard winter, laid in heavy stocks, thinking they would have difficulty in getting the regular supplies and now must refuse further consignments. The estimated output for the Connellsville district for the week ending Jan. 6 was 282,173 tons with 22,186 ovens active out of a total of 23,313, leaving 1,127 idle. The coke plants of the region are running practically to capacity.

The Northwestern Foundry Supply Co., Detroit, suffered a loss of $1,000 by fire Jan. 3.

CHICAGO.

Office of *The Iron Trade Review*,
1164 Monadnock Block, January 16.

Pig Iron.—Pig iron gives evidence of being about to demonstrate again that it is a law only unto itself. Despite the extraordinary strength of other materials, it is toppling on the verge of a decline. The dullness exhibited in the closing weeks of 1905 has lengthened beyond the expectations of sellers and the first signs of weakness in several months are now apparent. Last week, offerings of southern iron were made on the basis of $14 Birmingham for No. 2 foundry. This is 50 cents a ton less than the minimum price which has been maintained since November, and marks the first step backward in six months. The leading makers have not met this concession as yet, and the change will doubtless be made as gradually and imperceptibly as was the discontinuance of the effort to put southern irons on the $15 basis, which ceased early this year. Northern irons are still quoted at $19.25 Chicago for No. 2 foundry; and while sharing in the quietness that prevails, are firm at that price. Demand for forward deliveries is light; even the discussion of future requirements among western foundrymen being of an apathetic nature. The largest inquiry this week is for 3,000 tons of basic. This will probably be placed with a valley furnace because of the impossibility of getting deliveries from southern makers earlier than March or April. The shortage of cars and labor in the south is seriously delaying deliveries and has developed in this market an intermittent demand for spot iron. Lake Superior charcoal is strong and scarce, and has advanced to $20.50 Chicago. High silicon irons are also hard to obtain and are firm in price. We have revised our quotations, and quote as follows:

Lake Superior charcoal	$20.50 to 21.00
Northern Foundry No. 1	19.75 to 20.00
Northern Foundry No. 2	19.25 to 19.50
Northern Foundry No. 3	18.75 to 19.00
Northern Scotch Foundry	20.00 to 20.50
Ohio Strong Softeners No. 1	20.30 to 20.80
Ohio Strong Softeners No. 2	19.80 to 20.30
Southern Foundry No. 1	18.15 to 18.65
Southern Foundry No. 2	17.65 to 18.15
Southern Foundry No. 3	17.15 to 17.65
Southern Foundry No. 4	16.90 to 17.40
Southern No. 1 Soft	18.15 to 18.65
Southern No. 2 Soft	17.65 to 18.15
Southern Gray Forge	16.40 to 16.65
Southern Mottled	16.15 to 16.40
Southern Silveries (4 percent to 6 percent Silicon)	19.15 to 19.65
Jackson Co. Silveries (8 percent to 10 percent Silicon)	23.30 to 24.30
Alabama and Georgia Car Wheel	22.65 to 23.15
Malleable Bessemer	19.50 to 20.00
Basic Iron	18.65 to 18.90

Billets and Rods.—Demand for both these products continues to be of a very pressing nature and far beyond the available supply. Only one local interest has any forging billets for sale, for which it asks from $35 to $36 Chicago. Wire rods are offered at $36 Chicago for Bessemer, and $37 for basic.

Iron and Steel Bars.—New tonnage in steel bars is limited to the supplementary contracts of consumers whose requirements have exceeded their original estimates. These, however, figure up an unusually large tonnage, and taken in conjunction with the tremendous volume of specifications indicate a healthy condition of trade in consuming lines. The outlook for bar iron is much brighter than it was. The heavy purchases of rolling stock in the last two weeks, among which was the Rock Island order for 4,500 cars, is expected to develop an active inquiry for this product at an early date. At present, bar iron is held at 1.82½c to 1.85c Chicago, but higher prices are looked for with the first improvement in demand. New tonnage since the first of the year has been light, though specifications have more than held their own and kept mills working to their fullest capacity. We quote carload lots, mill shipments, Chicago delivery, as follows: Soft steel bars and bands, 1.66½c half extras; soft steel angles less than 3 x 3, 1.76½c; hoops, 2.01½c; base, full extras; hard steel angles, 1.70c to 1.80c. Jobbers' prices are firm as follows: Bar iron, 2c to 2.10c full extras; soft steel rounds and squares, 2 inches and larger, $2 per 100 pounds base; flats, 2 inches and 4 inches by 1⅛-inch and thicker, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half ovals and half rounds, $2 per 100 pounds base; steel bands, 1.95c to 2c half extras; soft steel hoops, 2.30c to 2.40c full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Sheets.—For the first time in some months, there is no disposition on the part of western makers of sheets to shade the prices of the leading interest. The new schedule which went into effect last week, consisting of an advance of $2 a ton in black and galvanized sheets and of $1 a ton in blue annealed, is being uniformly maintained by all sellers in this market. The new prices have not stimulated demand to any extent simply because consumers in this territory covered amply for their future requirements several weeks ago. Specifications, however, are free and of good volume. We quote carload lots, black sheets, blue annealed, Nos. 8, 9 and 10, 1.86½c; Nos. 11 and 12, 1.91½c; Nos. 13 and 14, 1.96½c; Nos. 15 and 16, 2.06½c. Box annealed, Nos. 18-20, 2.31½c; Nos. 22-24, 2.36½c; No. 26, 2.41½c; No. 27, 2.46½c; No. 28, 2.56½c; No. 29, 2.71½c; No. 30, 2.81½c. Jobbers have advanced their prices on lots from warehouse stocks in line with the change in mill quotations. We quote as follows: No. 10, 2.10c to 2.15c; No. 12, 2.15c to 2.20c; No. 14, 2.20c to 2.25c; No. 16, 2.30c to 2.35c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.70c to 2.75c; No. 30, 3.25c to 3.35c.

Quotations on galvanized shipments, carload lots, mill shipments, are as follows: Nos. 10-11, 2.51½c; Nos. 17-21, 2.86½c; Nos. 22-24, 3.01½c; Nos. 25-26, 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c; No. 30, 4.11½c. From store, galvanized sheets are quoted as follows: Nos. 10, 12 and 14, 3.10c to 3.20c; Nos. 16, 18 and 20, 3c to 3.10c; Nos. 22 and 24, 3.15c to 3.25c; No. 26, 3.35c to 3.45c; No. 27, 3.55c to 3.65c; No. 28, 3.75c to 3.85c.

Plates.—There is a fair demand for plates, but owing to the tightly sold-up condition of the leading western interest for the next six months, all inquiries are deflected to eastern mills or local jobbers. Prices are firm, but without change, and we quote mill shipments, Chicago delivery, as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store prices are very firm. We quote from local stocks: tank steel, ¼-inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch to 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—The market has no new features of especial importance. Specifications continue very heavy and deliveries from mills slow. There is a fair volume of new tonnage from local structural yards which are placing orders today for delivery late in the year. We quote mill shipments, f. o. b. Chicago, as follows: Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: All angles, 3 inches and larger, $2.25 per 100 pounds base; tees, 3 inches and lar-

ger, $2.30 per 100 pounds base; 3, 5, 9, 12 and 15-inch beams, $2.25 per 100 pounds base; 4, 8 and 10-inch beams, $2.50 per 100 pounds base; 6, 7, 18, 20 and 24-inch beams, $2.75 per 100 pounds base; 3, 4, 9, 12 and 15-inch channels, $2.25 per 100 pounds base; 6, 7, 8 and 10-inch channels, $2.50 per 100 pounds base; 5-inch channels, $2.75 per 100 pounds base.

Rails and Track Supplies.—The scarcity of spikes and track bolts has pushed prices up sharply. There is no regular quotation, every transaction being law unto itself. Recent quotations for spikes are 2.10c Chicago and for track bolts 3c. Demand for light rails continues heavy and the western mill is continually sold ahead of its output. Standard sections are quiet owing to the impossibility of getting early deliveries from mills. We quote as follows, all prices f. o. b. mill:

Heavy sections, $28; light rails: 12-pound sections $31; 16-pound, $30; 20-pound, $29; 25-pound, $28; 30 pounds and heavier, $27 to $28. Track supplies, angle bars, 1.50c to 1.75c; spikes, 2.10c; track bolts, 3¼ x ¾, with square nuts, $3 per 100 pounds; with hexagon nuts, $3.15.

Merchant Steel.—There is an abundance of business offered makers of agricultural shapes. Specifications are also extremely heavy, and are continually in excess of the output of mills. Prices are strong, but without change. We quote mill shipments, f. o. b. Chicago, as follows:

Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c base; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting 65 and 2½ per cent off to dealers, 50 per cent off in carload lots and 45 per cent in less than carload lots. Crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up.

Cast Iron Pipe.—The inquiries from St. Paul, Minneapolis and Bismarck N. D. mentioned a week ago, have not yet developed into orders. The St. Paul requirements amounting to 1,500 tons will be readvertised. Contracts are expected to be let this week by the municipal officials of St. Louis, Mo., and St. Charles, Ill., for 6,500 tons and 800 tons of pipe respectively. Prices are very strong and an advance is talked of. We quote carload lots, f. o. b. Chicago, 4-inch water pipe, $31; 6, 8, 10 and 12-inch, $30; larger sizes, $29.50; gas pipe, $1 extra.

Merchant Pipe.—No change is noted in the local situation. New business is light because of the general suspension in this territory of building operations. Jobbers are specifying freely, however, placing the material in storage for the spring trade. Official prices are uniformly maintained in this market. We quote carload lots, f. o. b. Chicago, ¾ to 6-in. black steel pipe, 78.35 per cent discount from list and galvanized 68.35 per cent. From stock, jobbers are quoting 76½ to 77 per cent discount on the base sizes ¾ to 6-inch black steel pipe.

Boiler Tubes.—Local sales are largely restricted to lots from jobbers' stocks. Generally speaking, the trade is quiet. The following prices are firmly maintained:

	Steel	Iron	Seamless
1 to 1⅛ inches	40.35	37.35	53.00
1⅜ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
Up to 4½ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1⅛ inches inclusive	40	35	42½
1¼ to 2¼ inches, inclusive	50	35	35
2½ inches, inclusive	52½	35	36
2¾ to 5 inches, inclusive	60	47½	42½

Wire Products.—There is an excellent demand for nails and fencing. Stocks in jobbers' hands are low and from all parts of the country specifications and new tonnage are coming in freely. Producers are unable to keep pace with the requirements of their customers and are falling further behind in their deliveries. Prices are strong at the last advance. We quote carload lots to jobbers, Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barb wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Coke.—Coke moves along in sympathy with pig iron, and is slow in strengthening. The amount of fuel constantly on track in this city prevents the maintenance of any schedule of prices, and until the arrival of bad weather no improvement is expected. Connellsville 72-hour grades for forward deliveries are offered at $3.50 ovens, or $6.15 Chicago, but spot coke is frequently sold as low as $5.65 Chicago. Solvay by-product coke is in good demand and quoted at $6.15 Chicago.

Old Material.—The spring-like weather that continues to prevail is gradually forcing prices downward. The softness of the bar-iron market has also contributed to the weakness that is felt in the raw product. All the dealers are carrying large stocks and the accumulations of railroads are not eagerly sought after. There is no heavy movement either east or west along consumptive lines, such trading as is done being limited to carload lots of various materials for "filling-in" purposes. Railroad wrought, dealer's forge, pipe and flues, No. 1 mill, busheling, and cut boilers have each declined 50 cents a ton. Car wheels and iron rails are firm in price and strong in demand. Our revised quotations are as follows, gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$17.25 to 17.75
Old Steel Rails (less than 4 feet)	16.00 to 16.50
Old Car Wheels	19.00 to 19.50
Old Iron Rails	23.00 to 23.50
Relaying Rails subject to inspection	26.50 to 27.00
Heavy Melting Steel	15.00 to 15.50
Mixed Country Steel	12.50 to 13.00

For net tons we quote as follows:

No. 1 R. R. Wrought	$17.25 to 17.75
No. 2 R. R. Wrought	16.75 to 17.25
Shafting	18.00 to 18.50
Dealers' Forge No. 1	14.00 to 14.50
Wrought Pipe and Flues	12.00 to 12.50
No. 1 Cast, 150 pounds and less	14.50 to 15.00
No. 1 Mill	9.00 to 9.50
No. 1 Busheling	12.50 to 13.00
No. 2 Busheling	12.00 to 12.50
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	12.50 to 13.00
Boiler Punchings	15.00 to 15.50
Iron Car Axles	24.00 to 24.50
Steel Car Axles	20.00 to 21.00
Iron Axle Turnings	12.25 to 12.75
Cast Borings	10.00 to 10.50
Mixed Borings, etc.	10.00 to 10.50
Machine Shop Turnings	12.25 to 12.75
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.00 to 14.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Old Iron Splice Bars	20.00 to 20.50

NEW YORK.

Increased Inquiry in Pig Iron Market —Total Sales Near 50,000 tons.

OFFICE OF *The Iron Trade Review*, ROOM 1315, No. 150 NASSAU ST., January 16.

Pig Iron.—Although sales have not been heavy during the past week, the market is strong and the upward tendency of prices continues. In the last few days inquiry for foundry and mill irons has again become heavy and producers are as hopeful of the future as possible. Total transactions of the week will foot up to nearly 50,000 tons of which about one half involve foundry grades and the remainder steel irons. These purchases by steel makers include all the odd lots of misfit irons which have been picked up here and there. Transactions in basic have not been this week as heavy as during the weeks immediately preceding. A few sizable lots of foundry iron were taken by pipe founders, but the bulk of the purchases in this class were in comparatively small lots for general foundry and machine work. Prices have strengthened perceptibly during the week. While one producer disposed of some 2,000 tons of New York state iron on the basis of $17.50 at the furnace, others are refusing offers at that price and are demanding $17.75. A

lot of 2,000 tons Virginia No. 2 brought $16.00 at the furnace. Another of 3,000 tons special analysis foundry, northern, was sold on the basis of $18.00 at the furnace. Most of the sales of foundry iron in lots from 100 to 500 tons brought the regular prices. Ferro-manganese is exceedingly strong with the supply almost completely sold up until the end of the first half of the year. It seems almost inevitable that famine conditions should prevail for some months to come. The ore situation in the Caucasus is reported to be extremely unfavorable. Advices last week told of vessels having an aggregate tonnage of 75,000 waiting at the chief port for their expected cargo. Material for early shipment is almost unobtainable, but ferro-manganese quotations range from $150 to $175 per ton.

The following are prices at tidewater:

Northern No. 1 Foundry	$18.75 to 19.50
No. 2 Foundry	18.00 to 18.75
No. 2 Plain	17.75 to 18.25
No. 1 Southern Foundry	18.75
No. 2 Southern Foundry	18.25
No. 3 Southern Foundry	17.25 to 18.00
No. 4 Foundry	17.00 to 17.25

Pig Iron Certificates.—The market has been dull and uninteresting, there being little inclination either to buy or to sell. Sales have been few and price changes inconsiderable. The total sales of the week probably did not exceed 1,000 tons.

Foundry iron warrants follow:

	Bid.	Asked.
January	16.50	17.25
February	16.50	17.00
March	16.50	17.10
April	16.50	17.20
May	16.50	17.20
June	16.50	17.20

Finished Iron and Steel.—Inquiry for building material shows the effect of the lull usually to be expected during this season of the year, but the railroads are calling for increased quantities of bridge materials and the structural field presents a satisfactory outlook. Orders for 17,000 tons of bridge material required by the Tidewater railroad were placed during the week, 5,000 tons going to a southern company and the remainder to northern firms. Two contracts for buildings in this city requiring about 1,200 tons have been placed and other industrial extensions are in prospect. The Cambria Steel Co. secured the contract for 1,500 tons of steel required in the construction of the Stalman Building, Nashville, Tenn. Business in plates and steel bars has been only moderate in volume, but specifications on old contracts have been comparatively heavy. Transactions in the lighter products, tin plates, sheets, and wire products have not been as heavy as before the recent advance which was to a certain extent anticipated.

The following are the prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84c; beams, 3 to 15 inches, 1.84¼c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine and ordinary fire box, 1.94½c; refined iron bars, 1.84½c; soft steel bars, 1.64½c to 1.79c; sheets, No. 28 black, 2.40c.

Old Materials.—The market in all classes of scrap material is somewhat weaker in tone although there have been transactions of considerable size especially in heavy melting steel. Several lots of old rails are held by railroads, but no considerable transactions have come to light. There appears to be a little more interest in wrought scrap, but holders are not anxious to sell. The following are prices approximately f. o. b. tidewater.

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	15.50 to 16.00
Old steel rails, short pieces	15.00 to 15.50
Relaying rails	23.00 to 24.00
Old car wheels	17.50 to 18.00
Old iron car axles	24.00 to 25.00
Old steel car axles	19.00 to 19.50
Heavy melting steel scrap	15.50 to 16.00
No. 1 railroad wrought scrap	20.00 to 21.00
Iron track scrap	18.00 to 19.00
Wrought pipe	14.00 to 15.00
Cast borings	10.00 to 10.25
Wrought turnings	14.50 to 15.50

CINCINNATI.

Pig Iron Quiet with Quotations Still as Low as $14, Birmingham.

January 16.

Pig Iron.—The market has been quiet although a fair run of small orders for prompt shipment and first quarter delivery have been placed. A few buyers are showing interest in the market by asking for quotations for second quarter delivery, but without any expressed intention of purchasing. A southern Ohio manufacturer asks for prices on 500 tons of southern No. 3 foundry for prompt shipment and has received quotations on the basis of $13.50 Birmingham confirming the continuance of $14.00 Birmingham for No. 2 foundry as the minimum price. A 2,000 ton order for basic iron was placed by a Michigan concern on the basis of $17.00 valley furnace. A sale of 5,000 tons of northern car wheel iron on which the price was not made public was consumated during the week. The reported heavy purchase of the United States Steel Corporation has had but little effect on the foundry iron market. While $14.00 Birmingham for No. 2 foundry is still quoted with considerable freedom, a few sales have been reported at $14.25 to $14.50 and in St. Louis territory one transaction on an analysis basis was made at $14.75 for No. 2 foundry Birmingham, but this was regarded as exceptional. In a general way the situation shows but little change in northern irons and $17.50 to $18.00 are the ruling prices for No. 2 foundry at southern Ohio furnaces. The consensus of opinion among the sales agencies is that buyers will be inclined to defer making their purchases for second quarter requirements until the market shows a more pronounced tendency. It is argued that the price at present is too high to offer inducements for purchases covering future needs especially with the present rate of consumption and as buyers are generally fairly well covered for the first quarter it is not unlikely that they will buy conservatively for the present. It has been suggested that some of the business placed the past week was induced to obtain advantage of the present freight rate which will be advanced twenty-five cents per ton on March 1. Buyers are also urging that their March quota of iron be shipped in February before the advance takes effect.

Southern Foundry No. 1	$17.25 to 17.75
Southern Foundry No. 2	16.75 to 17.25
Southern Foundry No. 3	16.25 to 16.75
Southern Foundry No. 4	15.75 to 16.25
Southern Foundry No. 1, soft	17.25 to 17.75
Southern Foundry No. 2, soft	16.75 to 17.25
Gray Forge	15.75 to 16.00
Northern Foundry No. 1	19.15 to 19.65
Northern Foundry No. 2	18.65 to 19.15
Northern Foundry No. 3	18.15 to 18.65
Jackson County Silvery, 8 per cent	20.15 to 20.65
Southern Charcoal	19.75 to 20.25

Finished Material.—The market continues firm with a good demand for all descriptions. Bar iron is quoted at 1.85c to 1.90c and the recent advance in sheets is well sustained. We quote: steel bars at 1.63c, half extras with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets No. 10 and No. 12, in car lots are 2.58c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c; No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.35c to 2.60c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe the market continues firm with quotations on wrought iron pipe withdrawn and only quoted on application with specifications and subject to ability to furnish sizes required. We quote f. o. b. Cincinnati as follows:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—With an improved car supply in most of the coke producing districts

the offerings have been more free and the market easy and lower. The business is mostly in prompt shipment orders, as foundries and furnaces have to a large extent covered their requirements for the first half of the year.

†Wise County, Va. Furnace Coke prompt shipment	$2.75 to 3.00 per ton
Wise County, Va. Foundry Coke prompt shipment	3.00 to 3.25 per ton
Pocahontas Furnace Coke on contracts	2.50 to 2.75 per ton
Pocahontas Foundry Coke on contracts	2.75 to 3.00 per ton
Connellsville Furnace Coke prompt shipment	2.50 to 2.75 per ton
Connellsville Foundry Coke prompt shipment	3.00 to 3.25 per ton
New River Foundry Coke on contracts or prompt shipment	3.00 to 3.25 per ton
New River Furnace Coke, prompt shipment	2.50 to 2.75 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—A firm tone prevails and there is moderate activity in the market. We quote f. o. b. Cincinnati:

Old No.1 railroad wrought, net tons	$17.50 to 18.00
Cast machine and foundry, net tons	14.00 to 14.50
Old iron rails, gross tons	24.00 to 25.00
Old steel rails, gross tons	16.50 to 17.00
Old short lengths, gross tons	17.50 to 18.00
Old iron axles, net tons	23.50 to 24.00
Stove plate, net tons	10.50 to 11.00
Wrought turnings, net tons	11.00 to 12.00
Cast borings, net tons	9.00 to 9.50
Car wheels, net tons	16.50 to 17.00

PHILADELPHIA.

Favorable Conditions Continue—Supply of Basic Exhausted.

January 16.

Pig Iron.—Nothing has occurred during the past week to cloud the rosy prospects with which the new year began. Indeed, from the standpoint of the furnace-men the outlook steadily strengthens, and strong intimations of an advance in prices in the near future have been received from several sources. Notwithstanding the enormous buying of the past two months it appears that there are still a number of large consumers who have not placed their orders for the second quarter and who have held off in the expectation of lower prices. These must come into the market very soon, and their buying is expected to start another upward move in prices. For the past week these have been very firm. The recent heavy purchases of basic by the United States Steel Corporation and other large interests seem to have pretty well cleaned up the market for that grade, and there is no let-up in the demand for foundry irons. There has been no material change in prices, but the outside range is now more frequently obtained than the lower. A change may come any day, but for the present these figures may be quoted:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.25
Standard Gray Forge	17.00 to 17.50
Basic	18.00 to 18.25
Low Phosphorus	24.50 to 25.00
Southern No. 2X, rail	18.75 to 19.00

Finished Material.—Following the advance in tin plates, sheets, wire products, etc., some talk is heard of an advance in structural material, plates, angles, etc., but it cannot be learned that this is based on anything more tangible than the generally prosperous and active condition of the trade. Importers of Norwegian iron have advanced the price to 2.95c, and bar iron continues very strong. In other lines schedule prices remain unchanged as follows: Beams, channels and angles according to specifications, 1.82½c to 2.50c; refined iron bars, 1.75c to 1.85c; steel bars, 1.63½c to 1.83c; plates 1.73½c to 1.83½c.

Old Materials.—The market is quiet, with something of a tendency to weakness in steel scrap, as the mills seem to have accumulated a large amount of material and are not buying freely. In the following quotations concessions are noted in No. 1 steel scrap, old iron axles, choice R. R. No. 1, and yard scrap, while there has been an advance of a quarter in wrought turnings:

Old steel rails	$18.5 to 18.50
No. 1 steel scrap	17.25 to 18.00
Old steel axles	21.50 to 22.00
Old iron axles	27.00 to 28.00
Old iron rails	23.00 to 24.00
Old car wheels	17.50 to 18.00
Choice scrap, R. R. No. 1 wrought	21.00 to 22.00
No. 1 yard scrap	19.50 to 20.00
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	23.00 to 24.00
Wrought iron pipe	16.50 to 17.00
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary	13.25 to 13.70
Wrought turnings	14.75 to 15.25
Axle turnings, heavy	15.50 to 16.00
Cast borings	10.50 to 11.25
Stove plates	13.50 to 14.00

Improving Prospects.—The steadily improving prospects of the Lake Superior Corporation, which controls the Algoma Steel Co. at Sault Ste. Marie, Ont., has been reflected during the past week in a marked rise in the company's securities on the Philadelphia stock exchange, where there has been quite an active speculation in them. On Monday the income bonds, which during 1905 fell as low as 30, rose to 59, closing at 58, while the stock, which last year sank to 14½, closed at 23½. This improvement in prices was due to a semi-official statement that the company is now earning about $100,000 a month, that the interest on the income bonds will be paid next October, that arrangements are under way for paying off the loan of $2,000,000 made by the Ontario government, and that the outlook for large earnings is very bright. During the present year it is planned to erect an open-hearth furnace, to install coke ovens, repair the Michigan power canal so that a full head of water may be utilized, and to work out other plans which will add materially to the company's earning capacity.

CLEVELAND.

Fair Demand for Pig Iron — Finishing Mills Very Active — Coke Weak.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, January 17.

Pig Iron.—Developments of the past week in this district have served to strengthen the local market and to remove any likelihood of a decreased demand or lower prices during the winter months. Selling has been fairly active and has been squarely at quotations which have prevailed for some weeks. While no contracts have been closed for very heavy tonnages, sales completed since our last review together with inquiries pending which will probably develop into sales before the end of the week aggregate in the neighborhood of 30,000 tons. With the exception of about 5,000 tons, this is all for first-half delivery and includes basic, malleable and foundry grades. The largest lot in this tonnage is 5,500 tons, the remainder consisting of a large number of smaller orders of which a goodly share goes to supply requirements of the foundries in this district, although other lines of consumption are well represented. If any factor was required in addition to the brisk local buying, to establish prices firmly on the basis of $17.50 valley, it was supplied by the recent large purchase of the Steel Corporation clearing up the valley supply for the first half and none of the week's sales in the Cleveland district has shaded this price. The contract for second-half delivery referred to above was at the same figure, but a number of smaller lots for delivery during the last half have been sold on a basis of $18.00. The active buying movement for the second half is expected to come in February; if it develops any very large demand the prediction is freely expressed that efforts to hold quotations at present levels will not be successful and advances of good size will result. Inquiries are pending for some southern iron on which the price of $14.50 now seems firmly established. Coke is still weak; cars are plentiful, spot shipments and forced sales are frequent and prices have accordingly weakened still further, good grades of furnace coke having been procured during the week at $2.60 and foundry grades at $3.40. We quote, Cleveland delivery, as follows:

Bessemer	$18.35
No. 1 Foundry	18.50 to 19.00
No. 2 Foundry	18.00 to 18.30
No. 3 Foundry	17.50 to 18.05
No. 2 Southern	17.85 to 18.35
Gray Forge	16.85 to 17.35
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.50 to 20.00

Iron Ore.—Occasional small lots are being sold, though the available supply is extremely small. On business of this

kind 1906 season prices prevail. It is not believed that furnaces are in danger of an ore famine during the winter, as the tonnage in yards is thought to be sufficient to meet the needs of all until navigation opens, though as usual considerable trading will be necessary. Eastern furnaces, which are not fully covered for their 1906 requirements, are still holding off. Ore is moving from docks to furnaces very slowly.

Finished Materials.—Mills are still busily engaged in trying to catch up with their bookings on plates, structurals and other lines, but the larger producers are still from three to six months behind, though some have been declining new business since early in the fall. Jobbers have met with considerable difficulty in keeping up their stocks, but their needs for the present year are well covered. Specifications continue as heavy as in the recent past. Manufacturers are preparing to the best of their ability for a season of greater building activity than during 1905. In spite of rumors of higher prices, it seems probable that, with the exception of rush orders placed with concerns catering to a premium business, structural material will cost no more than during the past summer. Car and ship building needs will be even heavier than in 1905 and the outlook is the same for general business in sheets, plates and bars. Steel bars are selling briskly, in many instances to replace the expensive iron bar, which continues to exhibit a wide range of prices, with 2c Youngstown as the maximum and 1.85c as the average. Sheets are in better demand. Steel casting concerns are so deluged with business that only the cream of their orders can secure anything approximating prompt attention. Railway supplies and light rails are in good demand.

Old Materials.—The weather has continued unfavorable to the scrap dealer and this line has failed to hold its own with the activity of the iron industry generally. Few sales are being made, mills being well suppiled and dealers willing to wait for severe weather to strengthen the situation. Prices are largely nominal. Forced sales are often below quotations and heavy melting steel prices can probably be shaded for small lots, but in some other intances top figures prevail. With these reservations, we quote, f. o. b. Cleveland, as follows:

Old Iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	16.75 to 17.75
Old steel rails (under 6 feet)	17.00 to 18.00
Old car wheels	17.50 to 18.00
Steel boiler plate	14.00 to 15.00
Steel axles	21.00 to 22.00
Malleable iron (railroad)	16.50 to 17.50
Malleable iron (agricultural)	15.50 to 16.50
Heavy steel	17.00 to 17.50

We quote as follows, net tons:

No. 1 R. R. wrought	17.50 to 18.00
No. 1 busheling	15.00 to 15.50
No. 1 machine cast	13.75 to 14.25
Iron axles	23.00 to 24.00
Axle turnings	11.50 to 12.50
Wrought turnings (free from cast)	11.00 to 12.00
Grate bars	9.50 to 10.00
Pipes and flues	13.50 to 14.50
Tank iron	11.00 to 11.50
Hoop and band iron	8.00 to 9.00
Sheet iron	7.00 to 8.00
Wrought drillings	11.00 to 12.00
Stove plate	10.50 to 11.00
Cast borings	8.50 to 9.50

BIRMINGHAM.

Production to be Increased — Plans for Improving Raw Material Supply.

Birmingham, Ala., Jan. 15.—Alabama pig iron manufacturers have been selling iron in small lots for delivery during the second quarter of the year and the indications are that the probable make for that period will shortly be announced as sold. The production in this state is to be improved some before the end of the week, the torch to be applied to one furnace for a certainty and probably to two. The prices are firm at $14.50 per ton for No. 2 foundry. There is some talk of an advance of fifty cents, but as far as can be learned there has been no increase in the quotations.

Some attention is being given by the larger companies to the raw material supplies. The Sloss-Sheffield Steel & Iron Co. has opened new ore mines at Irondale and will shortly be getting out a steady tonnage. The Tennessee Coal, Iron & Railroad Co. is giving some attention to ore mines in the southern part of Jefferson county and elsewhere. The Republic Iron & Steel Co. also is making improvements at ore mines and in its coal mines, looking to a steady supply of raw material for iron making. The Republic Company has equipped the Warner mines with an electrical haulage system and the production at this point should be improved. There is no little attention being paid to the coke production also and the prospects are bright that in a few months from now the supply of this commodity will not be so limited as now. Much trouble has been experienced during the past twelve months as to the supply of coke, and no small amount of the product was purchased in West Virginia and other districts.

The following iron quotations are still given in this district: No. 1, foundry, $15; No. 2, foundry, $14.50; No. 3, foundry, $14; No. 4, foundry, $13.50; gray forge, $12.50 to $13; No. 1, soft, $15; No. 2, soft, $14.50.

At the rolling mills there is steady work. Preparations are still under way to start another puddling department at the big Birmingham rolling mills. Prospects are bright in this industry for steady operation all through the year. A small advance in wages is to be allowed rolling mill employees in accordance to the quarterly conference between manufacturers and the Amalgamated Association.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*, ROOM 1315, NO. 150 NASSAU ST., January 17.

Pig Iron.—Nothing has occurred during the week but the market closed dull and easier to-day. There has been some uncertainty in regard to available supplies and domestic consumers have been compelled to buy rather heavily. Today's quotations follow: Spot, 36¾ to 37¼ and January, 36.50 to 36.90; February, 36.40 to 36.80; March, 36.30 to 36.70; London, £167 spot and future; arrivals for the month to date, 1,520; afloat, 3,615.

Copper.—The market is very dull and easy in tone. Consumers seem disposed to await developments. Today's closings follow: Lake and electrolytic, 18¾ to 19; casting, 18⅜ to 18⅞; London's closing today: £78 17s 6d and £77 12s 6d. Exports for the month to date, 7,351 tons.

Lead.—The market has been unsettled with irregular prices and closed easy. Today's closings: 5.85 to 5.95; St. Louis, 5.85; London, £16 15s.

Spelter.—Refined spelter is dull. Today's closings: 6.50 to 6.60; St. Louis, 6.50; London, £28.

Antimony.—Cookson's and Hallett's, 14½c to 15c and other grades, 13¾c to 14½c.

METAL TRADES ASSOCIATION NOTES.

Through the efforts of Assistant Secretary Cone of the N. M. T. A. a meeting of machinery manufacturers in the state of Georgia was held at the Piedmont Hotel, Atlanta, Ga., on Wednesday evening, January 10. The meeting was well attended and a resolution passed that it be the sense of the meeting that an association be formed to be known as the "Georgia branch of the National Metal Trades Association."

The boiler makers in Buffalo, N. Y., have gone out on strike because the employers refuse to sign an agreement drafted by the union which embodied a number of unreasonable and unfair demands. The employers have formed a permanent organization and will fight the union demands.

The New York Metal Trades Association will hold its annual meeting this week at which time the subject of the merging of the Association into the national body will be considered.

STEEL FUTURE OF UNITED STATES.

J. Stephen Jeans, secretary of the British Iron Trade Association, in presenting a "World Survey of Iron and Steel" in a recent number of the *Manufacturers' Record,* predicts a bright future for the industry in the United States.

"No one who has carefully studied the matter," he states, "can fail to see that the United States must contribute for the next half century, at any rate, the greater part of any future advance, alike in pig iron and in steel. No other country has the same supplies of cheap and rich raw material. No other country has its conditions of production in such good shape. No other country has such a colossal home demand. No other country can to the same extent enjoy the great benefits attendant upon production on a large scale. No other country is better protected from outside competition.

"The average annual output of pig iron from the United States (exported) over the last four years has not exceeded 45,000 tons and it is not likely to increase at present prices. But this is not a criterion of what we may see in the future. Although there are many countries in the world, less than 20 of them are pig-iron producers, and not more than four or five produce iron and steel for export. The 'manifest destiny' of the United States, with their vast resources, appears to me to be to produce more and more largely for export, and if it is found more profitable to export the finished forms of the metal rather than the cruder forms, so much the better for those engaged in the business.

Half the World's Supply.

"Since 1902 the means of producing iron and steel have been greatly increased alike in all countries. My friend, Mr. Swank, estimates the present capacity of the blast furnaces of the United States at over 30,000,000 tons a year. This is probably equal to about one half the capacity of the whole world today. Germany and Great Britain can under pressure produce about 22,000,000 tons and perhaps Russia, France and other countries could produce about 9,000,000 tons more, but this could only be done with some difficulty. It is necessary to have about ten percent of furnace plants under repair or reconstruction at any one time, and Germany has been working close up to this limit for some years past. . . . Great Britain has a much larger proportion of her plants inoperative, and always has had, mainly because of the more ancient character of the conditions under which many of them have been worked. It is not very probable that any large proportion of the plants now inactive in this country will be put in blast again. . . . No other European country is in a position to make large additions to its present output."

The Increase of Production.

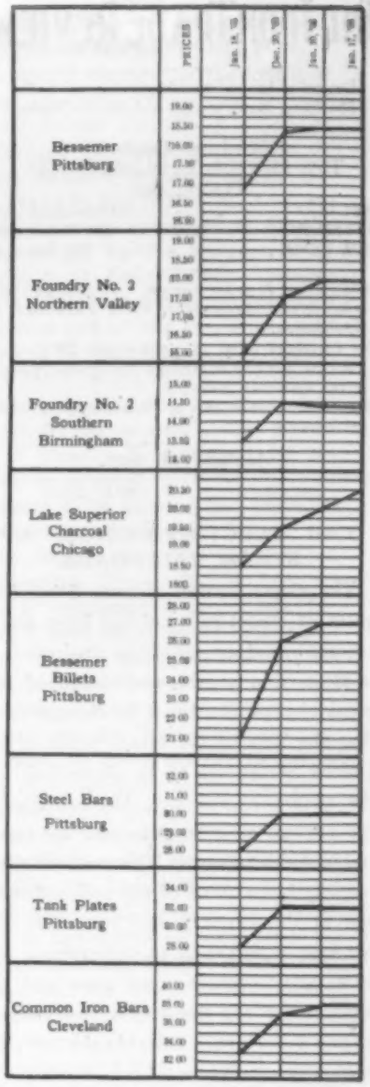
Mr. Jeans presents comparative tables of the ore output of the large producing countries for 1890 and 1904. The United States almost doubled its output in that time, Great Britain remained exactly stationary, Germany doubled its output as did France, Russia and Sweden made even larger gains though with relatively small tonnages at that, and Spain did little better than hold its own. During this period the increased use of leaner ores increased the average consumption per ton of iron from 2.03 to 2.2 tons. The same years showed corresponding increases in pig iron output from 9,203,000 tons to 16,497,000 tons in the United States, from 4,651,000 tons to 10,058,000 tons in Germany and from 902,000 tons to 2.978,000 tons in Russia. Great Britain in the fifteen years gained only a little more than a half million tons, from 7,904,000 tons to 8,563,000 tons.

"Assuming that the quantity of pig iron now annually produced will reach 52,000,000 tons," continues Mr. Jeans, "it is probable that nearly 38,000,000 tons of that quantity, or 73 percent of the whole, will be absorbed in the manufacture of steel. Hence it is clear that the future of the industry will depend on the demand for steel." The steel production for 1890 and 1904 in the leading countries was as follows: United States 4,277,000 tons, 13,767,000 tons; Great Britain 3,579,000 tons, 5,027,000 tons; Germany 2,232,000 tons, 8,930,000 tons; total for all countries 11,985,000 tons, 35,815,000 tons.

Value of Unworked Ores.

Concerning the scope of American iron ore deposits and their value, Mr. Jeans says: "it will not be overlooked in this connection that when the Steel Corporation was founded the value of the ores at its disposal was computed at $700,000,000, which worked out I think, to about $1 per ton of the total quantity computed to be then available, and that, too, before any provision had been made for working or transportation. Probably this was not overstated. On the contrary, I should be surprised if the directors of the the Steel Corporation, in view of the fuller knowledge that they now possess as to the limited volume of iron ores at command in relation to the increased and increasing output of iron, would not place the value of their unworked ores at more than they did in 1901."

PRICE CHART.



Hudson Iron Co. Improvement.—Improvements shortly to be made in the Secaucus, N. J. furnace plant of the Hudson Iron Co. will increase the capacity to at least 150 tons of pig iron per day. The changes to be made involve the purchase of three water-tube boilers of about 400 horsepower each: one double hoist to elevate material to the top of the stack: two hot-blast-stoves, the type not yet determined: and one pig casting machine. The plant will be so arranged that either foundry or basic iron can be produced and the change from one to the other can be made at short notice. The general offices of he company are at Rutherford, New Jersey.

James Reed, aged 53, died at the home of his father in Allegheny, Pa., Jan. 10. He had held a number of important positions with the Pennsylvania railroad, but about five years ago became connected with the Pressed Steel Car Co.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

Published every Thursday by
THE PENTON PUBLISHING CO.
CLEVELAND.

CHICAGO - - - 1164 Monadnock Block
PITTSBURG - - - - 521 Park Building
NEW YORK - - - - 150 Nassau St.

Subscription, $3 00 per annum. To Foreign Countries $4 50. Advertising Rates Furnished on Application.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

Entered at the Post Office at Cleveland, O., as second class matter.

January 18, 1906.

PRINTED IN AN OPEN SHOP.

THE ELECTRIFICATION OF STEAM RAILROADS.

The electrification of several hundred miles of steam railroad has been either accomplished or definitely projected. It is as certain as the realization of any great change can be at its inauguration that the bulk of the steam roads of the United States are to be electrified. In the nature of the case the rapidity of the change will be governed by financial considerations. The cost of electrifying but a third of the railroad mileage of the country will run well into ten figures and such an expenditure will necessarily require some time and the opportunity for the earlier investments to pay some profit towards the later investment.

The present perfection of the single-phase alternating system warrants its adoption as against the direct current, and involves an expenditure not half as great. A current estimate places the cost for a single track road at about $16,000 per mile against $37,000 per mile for the direct current third-rail system.

Much the same order will be observed as was the case with the rather sudden advent of the present high power locomotives. These were rapidly adopted by the great trunk lines, which at the time had many lighter engines in comparatively good condition. These latter were not scrapped, but were driven to the branch lines of the great railroads, were utilized in suburban service, or were sold to less important railroads at good figures. As more important sections of trackage are electrified the equipment displaced will find utilization elsewhere. It will not be necessary for any of it to be scrapped, and here again is seen reason for regarding the rapidity of the change to electricity for the direct power as one to be governed by financial considerations.

It is far from improbable, however, that when all the important trackage has been electrified, the minor branches will be operated otherwise than with direct steam power. In England the large single passenger car, driven by gasoline, has been found entirely feasible, and is in practical use. In the United States gasoline motor cars for inspection and section work are in regular use. One prominent manufacturer catalogs no less than twelve different gasoline motor cars for such purposes. The feasibility of the gasoline motor in automobiles is all the proof that is needed of the adaptability of this form of power to railroads where the traffic is limited.

The amount of money which will be spent within the next quarter century in the electrification of steam roads is simply enormous. Indications are that the sum will run very well into ten figures. The iron and steel industry will come in for a very large proportion of the total. Attention has lately been directed to the remarkable increase in the production of sheet steel in the United States in 1905. A large part of this heavy gain was due to the great increase in the use of steel sheets in electrical work. The electric industry is now one of the very largest single consumers of steel sheets, but steel sheets constitute only one of the many forms of iron and steel which will be consumed in large tonnages in the electrification of the steam roads.

THE STEEL CASTING INDUSTRY GROWING.

The Bessemer pig iron market lately has drawn attention to the growth of the steel casting industry. The producers of steel ingots are, generally speaking, manufacturers of pig iron, and buy a comparatively small part of the pig iron they consume. The steel casting works, on the other hand, buy all the pig iron they use. They have been heavy purchasers of Bessemer pig iron in the past few weeks and have constituted an important factor in this market. As the production of basic open-hearth castings is relatively small, Bessemer is by far the chief grade of pig iron purchased for the manufacture of steel castings.

It being the present purpose merely to draw attention to the rate at which the production of steel castings is growing, it is unnecessary to refer to the advantages of the steel casting over the gray iron casting. Suffice it to remark that for many purposes, and particularly for railroad rolling stock, the steel casting has come into great favor. Something might also be said of the growth of the malleable casting industry, which uses a variety of Bessemer pig, but that also is foreign to the present purpose.

A recent summary, more or less complete and of course entirely trustworthy, presented by the American Iron and Steel Association enumerates no less than 11 steel casting plants which have been completed since June 1, 1904, to which date the association's last directory was carried. A further list of erection in progress in December, 1905, enumerated no less than seven steel casting plants. In both cases these figures refer only to plants to use the pneumatic or open-hearth process. There has been new construction on a number of plants to use the crucible process, but on account of the relatively small tonnage of such plants it is not well to disturb the general figures by including them.

An interesting feature developed by the data referred to is that whereas the steel casting plants completed between June 1, 1904, and Dec. 1, 1905, involved six converters of various patterns and nine open-hearth furnaces, the new construction now in progress involves eight converters and but one open-hearth furnace. This presentation is, of course, not conclusive as to the relative favor in which the two general processes now stand, but it is indicative. One reason for the diversion is that while the open-hearth furnace has for years been an accomplished fact, susceptible of comparatively little modification or improvement as regards the production of steel cast-

ings, the Bessemer converter, or rather the general pneumatic process, has been much studied and a number of new types or variations have been brought forth. Another reason is that, as the steel casting encroaches further upon the field of the gray iron casting, the demand grows for a relatively cheaper product which while not altogether as good as the finest casting possible with the open-hearth process, is yet greatly superior to the iron casting. The converter promises tonnage, and indeed its introduction has been somewhat delayed by the timidity of manufacturers who in some cases have shrunk from the tonnages they would have to market if they operated a converter with regularity. One of the claims put forth for a new converter is frequently the smallness of the tonnage on which it can be economically operated.

The effort to adapt the Bessemer or pneumatic process to the production of small tonnages, as for castings, is by no means a new one. It is rather that only in late years have the efforts been particularly successful. The old Clapp-Griffiths or stationary converter was once in considerable favor, but late in the eighties it began to retrograde, and is now scarcely heard of. About 1887 the Robert-Bessemer process was introduced from France, and met with such a cordial reception that by November, 1889, there were seven Robert-Bessemer plants completed in the United States, with a total of 11 converters, and one plant was being built, to contain three converters, making a total of eight plants with 14 converters. The American Iron and Steel Association's directory of June, 1904, showed but two Robert-Bessemer plants, while it showed 17 other special Bessemer plants, with 25 converters, and since then there have been completed, or commenced, 11 plants, with 14 converters, of various types.

Statistics of steel casting production in 1905 are not yet available. The increase over any previous year will doubtless be found to have been very large, and production in the current year is destined to show a further large increase. Steel castings being used so largely for railroad work, the production naturally shows rather erratic variations. There was a slump of almost a fourth in production from 1903 to 1904. The statistics from 1898, the first year for which there are statistics, through 1904 show a rapid increase, except for the slump in 1904. They show a relatively greater increase in basic than in acid open-hearth castings and in Bessemer than in open-hearth castings. From 1898 to 1901 basic castings aggregated less than a fourth the total of open-hearth castings: in 1903 and 1904 they constituted nearly a third. While the open-hearth casting production in 1904 dropped almost to the tonnage of 1901, the production by the Bessemer process, although relatively insignificant, increased from 1901 to 1904 by 137 per cent. A great increase from the 1904 production is to be expected for 1905, and 1906.

All the statistics which have been gathered on the production of direct steel castings in the United States are presented in the following table:

Production of Direct Steel Castings, gross tons.

	Acid Bessemer.	Basic Open-hearth.	Acid Open-hearth.	Crucible etc.	Grand Total
1898	3,539	28,460	92,127	7,811	131,937
1899	3,939	38,689	130,040	7,444	181,112
1900	6,467	42,644	134,847	8,845	192,803
1901	6,704	94,941	206,681	9,184	317,570
1902	12,548	112,404	255,475	10,508	390,935
1903	18,099	134,879	165,409	11,818	430,205
1904	16,051	98,919	203,915	11,326	330,211

CONSULAR TRADE TIPS.

Tar macadam, with slag as the chief ingredient, is used extensively for road-making in England with good results.

The nail works of Belgium have formed a five year trust agreement to limit the production and avoid competition. As a result prices have gone soaring. All lines of the Belgian iron and steel industry are in a flourishing condition, with prices steadily advancing.

Structural iron and steel materials are much sought in Uraguay where there is great building activity. Roofing made of glass set in iron or steel frames is a favorite.

Spain maintains a floating school to acquaint its young men with commercial methods and the needs and opportunities of the various nations. On its next cruise, which is soon to be begun, a few American boys from 15 to 20 years of age will be admitted.

TOPPING IS PRESIDENT.

S. G. Cooper, Former Republic Head, Will Devote Himself to Old Firm.

At a special meeting of the board of directors of the Republic Iron & Steel Co., held at the New York offices of the company on January 11, John A. Topping, formerly president of the American Sheet & Tin Plate Co., was unanimously chosen president to fill the vacancy caused by the resignation of President S. G. Cooper. Mr. Topping was also elected a member of the board of directors and of the executive committee, and E. W. Oglebay was chosen to fill a place on the executive committee. A chairman of the executive committee, to fill the vacancy caused by the death of Charles S. Guthrie, still remains to be selected.

President S. G. Cooper had tendered his resignation some time before, the exacting duties as a member of his firm, Banning, Cooper & Co. Ltd., of Pittsburg, rendering it impossible for him to fill both offices at the same time. In fact, it was generally understood that Mr. Cooper accepted the presidency of the Republic Iron & Steel Co. only under protest. The executive committee gave to the press the following formal announcement of the change.

"Mr. Jno. A. Topping, formerly president of the American Sheet & Tin Plate Co., was today elected president of the Republic Iron & Steel Co., at the request of Mr. S. G. Cooper, Mr. Cooper finding it impossible to look after the affairs of Banning, Cooper & Co., Ltd., and also continue to act as president of the Republic Iron & Steel Co."

At a meeting of the executive committee John W. Gates, Grant B. Schley and S. G. Cooper were chosen a committee to draft suitable resolutions concerning the death of Charles S. Guthrie. The following resolution was prepared and unanimously adopted:

"Resolved, That it is the sad duty of the executive committee of the Republic Iron & Steel Co. to record the death of C. S. Guthrie, the chairman, and leading executive officer of the company. He was taken from us in the full vigor of manhood, while his mind was occupied with many plans for the promotion of the company's success. He was firmly convinced of the intrinsic merits of our enterprise, and, after becoming identified with its management, was untiring in his efforts in its behalf. His general knowledge of the great industry, to which he had given the best efforts of his life, was equaled by few; his push, energy and determination in meeting the difficult problems incident to its development, were acknowledged by all. In his death the country mourns the loss of one of the

conspicuous and deservedly successful representatives of the great interest to which his life's work has been so thoroughly and efficiently devoted, this company the loss of one of its enthusiastic and determined leaders and all who were in any way near him that of a reliable and devoted friend.

"The officers of the company are instructed to cause the foregoing short tribute to the memory of our departed friend to be suitably engrossed and to be transmitted to his bereaved family in token of our sincere sympathy and condolence."

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The annual meeting and observance of the tenth anniversary of the New England Foundrymen's Association was held at the Exchange Club, Boston, Wednesday, Jan. 10, at 4:30 p. m. The routine business was disposed of in the usual manner, President John Magee in the chair. The secretary reported a total membership of 118 concerns and two honorary members. The treasurer reported a large balance on hand and all bills paid. The election of officers resulted as follows: President, Walter B. Snow, B. F. Sturtevant & Co.; vice president, Wm. H. Bense, Kinsley Iron & Machine Co.; treasurer, George H. Lincoln, G. H. Lincoln & Co.; secretary, F. F. Stockwell, Barbour-Stockwell Co.

For an executive committee of five, the following were elected: H. A. Carpenter, A. Carpenter & Sons Foundry Co.; H. F. Arnold, American Tool & Machine Co.; Chas. J. Caley, Russell & Erwin Mfg. Co.; Aruthur Gibby, Mechanics' Iron Foundry; H. E. Wetherbee, Jas. Hunter Machine Co.

The new president, Mr. Snow, thanked the members in a very pleasing manner for the honor bestowed

Report was received of the death of Mr. M. J. Dyer, Valley Falls, R. I., and Messrs. Nicholson, Carpenter and Miller were appointed a committee to prepare resolutions.

After dinner Pres. Snow introduced Mr. Henry A. Carpenter, former president, who acted as toastmaster in his usual most acceptable manner and was particularly happy in the choice of his numerous quotations and sallies. He also congratulated the organization on its growth, declaring it to be the pioneer of local foundrymen's associations in this country and responsible for the formation of the national body.

Hon. Eugene N. Foss, of Boston, the principal guest and speaker, delivered an address on "Reciprocity," at the conclusion of which President Snow, spoke of the association's prosperity and urged renewed efforts on the part of the members to accomplish a wider growth.

STEEL IS KING.

Address by H. P. Bope Before the Wheeling Board of Trade — Duty of Business Men.

"The Steel Industry of Wheeling and Pittsburg," was the subject of an address before the Wheeling, W. Va., Board of Trade by First Vice President H. P. Bope, of the Carnegie Steel Co., Thursday evening, Jan. 11. Mr. Bope went into the subject quite extensively and pointed out that the two cities had practically the same interests, that what was of benefit to one was a benefit to both, and then spoke upon the immense advantages to be gained for this great source of tonnage by the improvement of the Ohio river.

After expressing his pleasure at meeting such a representative body of

HENRY P. BOPE.

men as the Wheeling Board of Trade, Mr. Bope said in part:

"The subject I have chosen might be considered a hackneyed one were it not for its great interest to two communities so closely allied as Pittsburg and Wheeling. Your aims are ours; your conditions are very much like those in Pittsburg; what affects us affects you; your prosperity is ours, and when the depression comes you will suffer equally with us.

"It has always been a strange thing to me how little interest men of business affairs take in what I may call Americana. They seem to think the history of their own country is contained only in the immediate present, regardless of the mighty story of the past. In this story there is no part more interesting, or more helpful for its experience, than the growth and development of the great steel industry. It has been the experience of all nations that the first great development in commerce has been along the lines of agriculture. Our country has been no exception to this rule. Prior to the civil war the great staple production in the country was cotton; cotton was indeed King. Our manufacturing establishments had not been developed to any extent, except those in New England, and the looms of Manchester and vicinity, in England, testified to the value of their trade in this commodity with the United States. It was this power, then, which gave to the southern statesmen their influence, and to a large extent continued their regnancy until the fatal day of secession. During the period of the war northern manufacturing establishments were either created or enlarged by the demands of the national government for munitions of war. At the close of the civil war the government ceased to be a purchaser and many of these establishments were turned into industrial lines—the beginning of the first great development of steel. And even then another great product of the soil, for a brief period, became monarch, because the great and fertile plains of the west, thrown open to immigration, produced an article which had, and has, almost as many varied uses as steel. I refer to corn. During these years the steel industry was making solid progress; the great iron masters were learning their lessons.

Immense Ore Shipments.

"In 1854 there were brought down from the northwest but 3,000 tons of ore. In 1902 this quantity had increased to 27,500,000 tons, and in 1905, the year just closed, the shipments from the northwest approximated 34,000,000 tons. The amount to come down this year will only be regulated by the carrying capacity of the railroads from the lower lake ports. It is not my intention to weary you with many statistics, because this industry has grown to such proportions that the figures used are almost beyond comprehension.

"The next step from iron ore is, of course, to pig. As far back as 1810 there were produced in the United States about 20,000 tons of pig iron. In 1902 this tonnage amounted to 18,000,000 tons, and in 1905 to 22,500,000 tons. New stacks will be in operation before the close of this year, and it may not be out of place to predict a tonnage well on to the 24,000,000 mark before 1906 closes.

"Certain it is, however, that steel is unquestionably King today, and almost all other industries base their prosperity, or the reverse, upon the condition of the steel industry. When I tell you that among its varied uses about 5,000 tons of steel alone are used annually in the manufacture of shoe eyelets and

buckles, you will understand how varied this industry has become."

New Uses for Steel.

Mr. Bope then cited a number of new uses for steel in substitution for wood with which his own company had been experimenting during the past year.

"And now what shall we say of the future? Statistics we have been gathering indicate that the great plains between the Alleghenies and the Rockies will be the home of the greatest industries and the greatest consumption of steel during probably the next ten years. In this prosperity you are, of course, to share, your location being equal to that of Pittsburg and your advantages quite as great.

"With the opening of the Ohio river to Cairo with a nine foot boating stage, it is not a dream to expect to see fleets of steel barges, with steel tugs ascending and descending the two great rivers, distributing the product of this great community of ours, one in purpose and interest, out through the Gulf to Central and South Americas, and beyond, through the Panama canal, to the busy orient. In making this statement I do not mean to disparage the great facilities of the railroads; but the increase in business will overtax the facilities and further advantages will be needed if we are to take care of this tremendous output which the future o'ershadows.

"The first great proposition for us to consider, however, for the future, is the probable course of federal legislation with regard to corporations doing an interstate commerce business. States having been eliminated by the great use and unparralleled advantages of steam and electricity, this commerce has passed the boundary of the states and come into the domain of the nation. Commissioner Garfield, in his recent report, recognizes this fact and recommends that such corporations be put under either federal license or federal charter. It is the part of wise men not to oppose the inevitable, but to endeavor to so shape matters as to obtain the best results with the minimum amount of friction. Great corporations are a necessity today, and no one wishes to return to conditions antecedent to their organization. They have been beneficent largely in their results through the maintenance of a more stable condition of business, thereby insuring steadier employment for their workmen, whose interests have been recognized in many ways by the leaders of these corporations, many of whom have come from the ranks themselves. There is no wish on the part of the best of them to violate the law, but to live strictly within it. But I think you will agree with me that it is the business man who, from his long training and experience fully understands commercial propositions, should seek to guide legislation, rather than theorists, however honest and well-meaning. Business is so extraordinarily conservative, it takes so little to unsettle it, that it is safest in the hands of those who understand the delicacy of its operation.

Buying by Railroads.

"One great element that must also be considered is the railroads. They and their allied interests are, of course, the largest buyers in the country. Careful and farseeing managers of railroads recognize the value and importance of distributing their purchases over periods, rather than the forced buying at intervals, producing a congested condition of affairs, which has the effect of stimulating industry to an abnormal extent and enhancing values to the point where reaction is inevitable. In other words, there is today recognized between the railroad and the manufacturer a mutuality of interest, which tends toward conservatism in business affairs and the maintenance of stable conditions upon a plane of values, which affords a fair margin of profit to the manufacturer and by no means cripples the railroad.

"In conclusion, in all that is before us your state should certainly share to the fullest extent. Your fuel is at your door; your ores are as cheap as with us; your railroad rates are the same as those of Pittsburg. I shall not enter upon any statement of the industries of Wheeling, which have made it such a remarkable city in the past and are bound to do more for it in the future, because the statistics which I have at hand are those prepared by yourselves, and are, of course, familiar to you. But, in short, it may be said that a kindly and beneficent Providence has given you advantages more than you could have asked for yourselves, and with the energy displayed in the past, and with the aid of the long-headed, clear-sighted, far-reaching men of affairs, whom your body possesses, there seems to be hardly any limit to that to which you may aspire and which, it seems to me, you are in a fair way to obtain."

The railroad tonnage of Pittsburg for the first eleven months of 1905 is estimated at 86,404,836, more than the combined tonnage of its nearest rivals, Philadelphia and Chicago. The tonnage of Chicago for that period is given as 39,543,640, of Cleveland as 15,225,938 and New York as 12,266,606.

BOOK REVIEWS.

"Gas, Gasoline and Oil Engines," Fifteenth edition, by Gardner D. Hiscox, M. E., New York. Norman W. Henley Publishing Co. 6 x 9 inches, bound in cloth, 442 pages. Supplied by THE IRON TRADE REVIEW for $2.50.

While this is the fifteenth edition of this book it is really a new book, as it has been entirely rewritten and brought up to date, including the treatment of producer gas plants. The book is illustrated by over 350 illustrations, many of which are intricate line drawings showing the different parts of engines or their action. This book should certainly be in the hands of all interested, either as users or manufacturers, in the subject of gas, gasoline or oil engines.

"Evolution of the Machine Shop," by James Hartness. Published by the Jones & Lamson Machine Co., Springfield, Vt. 4 x 6 inches, 244 pages, illustrated, Leatherette, with gilt edges.

While this is a trade publication it does not belong in the class of ordinary trade publications or catalogs in any sense. In fact, the character of the book may be judged somewhat by the fact that the editor read it through, reading practically every word from cover to cover before attempting the review, and there is certainly a large amount of meat and good rich food for thought in the book. To attempt to review it in detail would result in the presentation of a very extended synopsis of the book, and hence we must content ourselves by saying that in this work the writer has shown what changes have taken place in the machine shop, and what constitutes a real working machine shop as far as tool equipment is concerned. The cutting action of tools is carefully considered and then the Hartness flat turret lathe is described, and it is pointed out how step by step the different parts of the machine have been evolved or designed to fit the requirements they are intended to meet. We think we are justified in saying that the designers of this machine have cut loose from traditional usage more fully than those of almost any other machine with which we are acquainted and have designed a machine capable of doing accurate work rapidly and economically. This little book should be in the hands of every thoughtful manufacturer and its contents should be made a part of his mental stock in trade.

The Domhoff & Joyce Co., Cincinnati, has been appointed sales agent for the Wellston Steel & Iron Co.'s "Wellston" brand of car wheel malleable and foundry pig iron.

RECORD COKE PRODUCTION.

Connellsville Output for 1905 Far Exceeded That of 1902.—Price Was High.

The coke production of the Connellsville region for the year 1905 exceeds by nearly four million tons the greatest record ever made in the district. The total production, as compiled by the *Connellsville, Pa., Courier*, an authority, for the year just past was 17,896,526 tons as compared with 12,427,468 tons in 1904, 13,345,230 in 1903 and 14,138,740 in 1902, which formerly held the record for production.

	1902	1903	1904	1905
January	1,173,860	1,134,272	718,382	1,283,152
February	971,048	958,981	845,428	1,350,128
March	1,133,978	1,274,863	1,062,192	1,497,756
April	1,219,928	1,346,053	1,118,043	1,843,502
May	1,300,648	1,288,550	1,146,907	1,451,554
June	1,234,596	1,379,257	945,520	1,354,470
July	1,271,045	1,327,239	887,402	1,622,998
August	1,238,260	1,211,826	975,724	1,328,002
September	1,246,095	1,239,265	1,153,471	1,726,734
October	1,230,860	1,041,966	1,148,089	1,430,238
November	1,079,037	629,768	1,207,131	1,488,942
December	1,039,385	513,187	1,219,174	1,519,050
Totals	14,138,740	13,345,230	12,427,468	17,896,526

The year started well and production held up throughout the whole twelve months. The average price for furnace coke for the year was $2.26, and during only three previous years was the average price better. In 1903 a record average price of $3 was reached, in 1902 the average price was $2.37 and in 1900 $2.70. The gross revenue from the sale of coke last year was greater than any previous year in the history of the industry. At an average arrived at by figures given during the four quarters of 1905, coke made in the Connellsville regions last year was worth $40,446,149. The nearest approach to this was in 1903 when the gross revenue of coke produced in the region was $40,035,906.

At the close of 1904 the Connellsville regions were making 325,000 tons of coke per week. There were 29,119 ovens in the two districts. At the close of 1905 there were 30,923 ovens in the regions and the estimated weekly production was 376,978 tons. There were 20,987 ovens active and 1,724 idle at the close of 1904 while the first of the present year saw 22,186 active and but 1,127 out of blast. The average daily shipment in 1905 was 1,886 cars. There were several months when they averaged over 2,000 cars. In 1904 the daily average was 1,623 cars, 1903, 1,782 cars, 1902, 1,986 cars and in 1901, 1,856 cars.

The accompanying table, compiled by the *Connellsville Courier*, shows the average shipments per month for the past four years.

The accompanying tabulated statement shows the total number of ovens at the close of each year, the annual output, average price and gross revenue of the region from 1880 to date:

Year	Total Ovens	Tons Shipped	Average Price	Gross Revenue
1880	7,211	2,205,946	$1.79	$ 3,948,643
1881	8,208	2,639,002	1.63	4,301,573
1882	9,283	3,043,394	1.47	4,473,889
1883	10,176	3,552,402	1.14	4,049,738
1884	10,543	3,192,105	1.13	3,607,078
1885	10,471	3,096,012	1.22	3,777,134
1886	10,952	4,180,521	1.36	5,701,086
1887	11,923	4,146,989	1.79	7,437,669
1888	13,975	4,955,553	1.19	5,884,081
1889	14,458	5,930,428	1.34	7,974,663
1890	16,020	6,464,156	1.94	12,537,370
1891	17,204	4,760,665	1.87	8,903,454
1892	17,256	6,329,452	1.83	11,598,407
1893	17,513	4,805,623	1.49	7,141,031
1894	17,834	5,454,451	1.00	5,454,451
1895	17,947	8,244,438	1.23	10,140,658
1896	18,351	5,411,602	1.90	10,282,043
1897	18,628	6,915,052	1.65	11,409,835
1898	18,643	8,460,112	1.55	13,113,179
1899	19,689	10,129,764	2.00	20,259,528
1900	20,954	10,166,234	2.70	27,448,832
1901	21,575	12,609,949	1.95	24,589,400
1902	26,329	14,138,740	2.37	33,508,714
1903	28,092	13,345,230	3.00	40,035,906
1904	29,119	12,427,468	1.75	21,748,069
1905	30,842	17,896,526	2.26	40,446,149

The cutter works of the Northwestern Mfg. Co., Fort Atkinson, Wis., burned Jan. 6, entailing a loss of $100,000.

GAS ENGINE INSPECTED.

Milwaukee, Wis., Jan. 12.—John Reis, assistant to the president of the United States Steel Corporation, says that all departments of this corporation are running to their full capacity, and that it is impossible to fill orders as speedily as is desired by consumers. He says the present year will, in his opinion, prove the best the iron industry of the country has ever experienced.

Mr. Reis was here with a party of engineers and heads of operating departments of steel plants, to inspect gas engines manufactured by the Allis Chalmers Co., for use in blast furnaces and steel mills. In the party were M. A. Neeland, assistant to Mr. Reis, New York; G. G. Thorp, vice president Illinois Steel Co., Chicago; H. A. Fennerty, general purchasing agent, Pittsburg; Edwin E. Slick, chief engineer; C. E. Dinkey, general superintendent Edgar Thomson works; A. E. Macoun, superintendent of furnaces, Edgar Thomson works; S. Dillan, chief engineer, Edgar Thomson works; H. Benn, superintendent Bessemer department, Edgar Thomson works; D. Miller, superintendent rail mill, Edgar Thomson works; Homer Williams, general superintendent Duquesne Steel works; William Ahlen, chief engineer Duquesne Steel works; W. H. Lewis, general superintendent South Sharon works; F. H. Daniels, chief engineer of the American Steel & Wire Co.; H. A. Barron, general superintendent Newburg works; Taylor Allderdice, third vice president of the National Tube Co.; G. G. Crawford, general manager of the same; James Wilson, superintendent of furnaces; W. A. Field, general superintendent South works, Illinois Steel Co., and E. B. Clark, assistant superintendent.

Richard Moldenke, secretary of the American Foundrymen's Association, announces that the government has taken over its standardizing bureau, and that hereafter the standardized drillings of cast iron prepared by the association will be procurable from the bureau of standards, department of commerce and labor. This system of standardization, which has found wide favor, was originated and developed by President Thomas D. West, of the association, and Professor Smith, of the Case School of Applied Science.

The Cambria Steamship Co., of Mentor, has been organized with a capitalization of $450,000 by Dan R. Hanna, R. L. Ireland, M. Andrews, S. W. Folsom and J. S. Ashley. The company will operate the two 600-foot freighters recently ordered by the Cambria Steel Co.

NEW TOWNS

Springing up on the Mesabi — Immense Shipping Operations.

Duluth, Jan. 15.—Near the St. Paul mine, which is being opened in section 23-57-22, west of the Stevenson, by Corrigan, McKinney & Co., there is to be a town Longyear. Bennett & Hill, who own much land in the vicinity, are to plat a site there. This is nine miles west of Hibbing and five miles from the proposed village of Snowball, one to the east and the other to the west. Still further west is the thriving village of Bovey where the Oliver Iron Mining Co. is opening several large mines. Between Bovey and Snowball there will doubtless be a town at the Holman and Diamond mines, which are also being opened by the Oliver Company. At the Holman will be a very elaborate mining and stripping plant, which has now been ordered from the makers and this will be installed as soon as the railroad is completed. An enormous amount of work is to be done on this part of the Mesabi range in the coming year or two. A large number of drills are now at work there, including an even dozen by the Oliver company on the recently bought Walker lands, purchased by it a few weeks ago, and at that time announced in this paper. The Walker purchase is now seen to be one of the shrewdest and most farsighted moves made by the Steel Corporation in this part of the country for a long time, and the credit for it is due to the Duluth management, for the action was opposed by some important officials for a time.

The Monongahela mine, in the Menominee district is being leased and will be operated heavily. It was under lease to Jones & Laughlin two years ago, but was abandoned after some exploration. There are about 1,000 acres in the land owned by the company and vigorous exploration will be carried on, both on surface and in the old workings.

The Penn Iron Co. is reopening its Norway property and will be more active there. Its new water power plant is progressing fast and the buildings will doubtless be ready for machinery long before the latter can be shipped. The General Electric Co. is installing this machinery plant, but it is very much crowded with orders of all kinds.

The business of the Calumet & Hecla Co. is so great that its force has been increased in the past 90 days by more than 1,000 men. It is shipping more copper than ever before, and is sending out its cars under such urgent demand that time is the essence of all freight contracts and most shipments are sent through on express time. This latter fact is true, also, of most of the Lake Superior copper mines. At the C & H five shafts additional to those in its Calumet conglomerate are being worked, three of the Osceola and two on the Kearsage lodes, both of which it has been developing into mines during the past five years, but on which it has done little mining till now.

At the Loretto mine, near Iron Mountain, an encouraging lense of excellent high grade ore has just been cut. It is especially encouraging as the mine has been looking none too well for some time past. It mined 100,000 tons last year.

Supt. G. L. Woodworth, of the Buffalo & Susquehanna properties, is now at work near Iron River. He is unwatering the old Hiawatha, which has been under lease to the Thoames of Milwaukee for two years, but is now given up by them, and he has drills on three other tracts near there.

It looks as though the Saginaw mine of Messrs. Geo. A. Baird and John T. Jones, at Norway, was a sure enough big thing. The drill that has been working down from the 240-foot level has cut good ore for 120 feet and is to be replaced by a machine capable of making 1,000 feet. The ore makes in length, also, to a considerable degree.

At the old Florence, long a small producer, preparations are in progress for a much larger product the coming year than the 199,000 tons gotten out in 1905, which was larger than the company had made for a long time previous.

The Dessau Iron Co., operating the Millie portion of the Pewabic mine deposit, has been reorganized and the mine will employ up to 100 men this year, and make a large product. It is a cheaply operated mine and its ore, while low in iron, is good in the furnace and is low in phosphorus.

LATE NEW YORK NEWS.

New York, Jan. 17.—The American Bridge Co. reports a few new orders including 1,400 tons of bridge material for the Lake Shore. Other interests will supply 1,900 tons for M. K. & T. shops and 7,200 tons of bridge materials. Ample business of all classes is in sight and shops are in good shape to care for it.

Wage Scale Advanced.—The bimonthly wage scale settlement between the Republic Iron & Steel Co., Youngstown, O., and the Amalgamated Association of Steel, Iron & Tin Workers last week fixed the wages of puddlers on a 1.5c base, or $5.75 per ton, an advance of 25c per ton for puddling. Finishers were given an advance of two per cent. The scale prevailing during November and December was on a 1.4c base or $5.50 per ton for puddlers.

OFFICERS ARE CHANGED.

At a meeting of the board of directors of Spang, Chalfant & Co., People's Bank Building, Pittsburg, last Monday, D. B. McClelland was appointed vice president and treasurer in addition to his duties as general sales agent. He succeeds Mr. C. W. Hanford, resigned, who goes to New York with Potter, Choate & Prentice, brokers. Mr. W. C. Heath was appointed treasurer succeeding Mr. E. W. Wright, who resigned to assume the duties of president of the new Pennsylvania Swedish Iron Co., which has erected a new plant at Cheswick, Pa. A. M. Bell was appointed assistant treasurer.

Injunction May be Issued.—Tiring of the violence of the striking foundrymen in Philadelphia, where the union men in 15 foundries went out several weeks ago because their request for an increase in wages was refused, the Niles-Bement-Pond Co. has appealed to the federal courts for protection. With that end in view, subpoenas are being served on the local and national officers of the Iron Molders' Union of North America summoning them to appear before the United States Circuit Court in Philadelphia on the first Monday in February to show cause why they should not be restrained from seeking to interfere with the non-union men working in the big machine works of Bement, Niles & Co., now controlled by the Niles-Bement-Pond Co. Some 20 subpoenas are being served, among those sought by the officers of the law being J. F. Valentine and Lawrence O'Keefe, the president and vice president of the Iron Molders' Union; Henry Donnelly, a traveling agent of the Union, and all the local officers. It is said that criminal proceedings may be instituted against the leaders in the trouble. The Philadelphia strike has been attended with a good deal of violence, which has unduly protracted it and has caused great annoyance to the proprietors of foundries involved. These have made their appeal to the federal courts because the officers of the Iron Molders' Union live outside of Pennylvania and would not be amenable to the courts of that state.

The bloom forging department of the new Pennsylvania Swedish Iron Co., at Cheswick, Pa., will start this week and the remainder of the plant will begin operations March 15. The officers of the company are E. W. Wright, president; A. M. Bell, secretary and treasurer, and Ambros Beard, formerly with the Dover Forge & Iron Co., vice president and general manager. This plant has been under construction only about two months.

PERSONALS.

W. A. Rogers of Rogers, Brown & Co., has started on a tour of the Mediterranean.

R. H. West, who has been connected with the Mesta Machine Co., as superintendent of the foundry, has resigned and taken the superintendency of the Vandergrift works of the United Engineering & Foundry Co. He is a son of Thomas D. West, the well-known foundryman.

Frank N. Johnson, formerly second vice president of the Scullin-Gallagher Iron & Steel Co., St., Louis, has been elected president, succeeding John Scullin, who has assumed the newly created office of president of the board. Other officers were chosen as follows: Thomas M. Gallagher, first vice president; W. J. McBride, second vice president; R. H. Weatherly, third vice president; V. C. Turner, secretary and treasurer; J. N. Maher, general manager.

Louis W. Powell, assistant general manager of the Oliver Iron Mining Co., and vice president of the Pittsburg Steamship Co., has resigned and will assume charge of extensive mining and smelting operations for a number of concerns with headquarters at Bisbee, Ariz. These mines in 1906 should produce from 25,000 to 28,000 tons of copper, worth not less than $9,000,000.

George H. Gardner, of the Gardner Elevator Co., Detroit, has accepted a position with the Howard Iron Works of Buffalo.

William H. Owen has resigned as general manager of the Owen Machine Tool Co., Springfield, O., and will be identified hereafter with the Kendrick Mfg. Co., Cincinnati. George Marx, one of the organizers of the Owen Co. and working manager, has also resigned.

Frank C. Kenney, president and manager of the Port Huron Bridge & Iron Co., Port Huron, Mich., has tendered his resignation.

Charles A. Borts of Toledo has been appointed superintendent of the new Fort Wayne Rolling Mill Co., Ft. Wayne, Ind., succeeding A. W. Tyler, resigned.

Chas. G. Washburn, Worcester, Mass., formerly treasurer, succeeds the late Stephen Salisbury as president of the board of trustees of the Worcester Polytechnic Institute. Mr. Washburn is a well known patent attorney and as a manufacturer has served in official capacity with the Washburn Wire Co., the Washburn & Moen Mfg. Co., and the Wire Goods Co.

F. I. Freeman, until recently associated with the George A. Hogg Iron & Steel Foundry Co., Pittsburg, has been made general superintendent of the Vulcan Foundry & Machine Co., the works of which are at New Castle, Pa.

Henry C. Ebert has accepted the presidency of the Cincinnati Car Co. and the vice presidency of the Ohio Tractions Co., resigning his position as assistant to the third vice president of the Westinghouse Electric & Mfg. Co. A dinner was held in his honor at the Hotel Schenley at which occasion the officers of the Westinghouse company presented him with a bronze electric stand lamp.

F. A. Carter has accepted a position with the Alliance Machine Co., Alliance, O., as manager of the sales department, severing his connection with the Morgan Engineering Co., where he has been for the past 25 years.

B. M. Whitlock has accepted the presidency of the Guanacevi Tunnel Co., resigning as vice president and general manager of the National Steel & Wire Co.

W. I. Babcock, formerly general manager of the Chicago Ship Building Co., has been appointed New York representative of the Bath Iron Works, Bath, Maine.

Herbert R. Hyatt, formerly with the Custodis Chimney Co., has been appointed district sales agent for the Weber Steel-Concrete Chimney Co., Chicago, with offices at 507 Singer Bldg., New York.

P. E. Weldy, formerly chief engineer of the Vulcan Iron Works Co., Toledo, O., has been made manager of the Bignall & Keeler Mfg. Co., Edwardsville, Ill.

Homer Bowes of Allegheny, Pa., has been given the general agency in the Pittsburg district and western Pennsylvania for the American concrete mixers.

J. Pierpont Morgan is to be honored by the Pittsburg Steamship Co., which will give his name to one of its 600-foot boats which will come out of Chicago yards in the spring.

Supt. D. H. Williams, of the South Sharon mills of the American Sheet & Tin Plate Co., has resigned. His successor has not yet been appointed.

OBITUARIES.

Richard John Pollard, secretary and treasurer of the James Bonar Foundry Co., Pittsburg, died Jan. 10 at Colorado Springs, Colo., where he had gone in an attempt to regain his health. He was educated at Cornell.

John R. Daggers died at his home in Paterson, N. J., on Jan. 6 at the age of 87. He was born in Preston, England, and came to this country 71 years ago. For several years he was employed in the shops of the Rogers Locomotive Co. in Paterson, and later served as special agent of the company in the south. In 1858 he purchased an interest in the bobbin factory of Scull & Co. and later became sole owner. He was appointed lay judge more than 30 years ago. He leaves a widow, a son and four daughters.

John W. Paxson, whose death was briefly mentioned in the issue of Jan. 11, was born and brought up on a farm in Bucks County, Pa. Then he clerked in a country grocery and in 1855 launched out into the molding sand business. He served in the Civil War, after which he set about increasing his trade in sand and foundry supplies. Later he was joined by J. K. Bougher, now president of the J. W. Paxson Co., Philadelphia, Howard Evans, vice president, H. M. Bougher, secretary and treasurer; J. S. Hibbs, assistant general manager, and S. C. Bougher, purchasing agent. Mr. Paxson was a member of the Society of Friends, in accordance with whose customs the funeral was conducted. He was fond of travel, having visited most of the principal cities of the world and crossed the ocean 18 times. He leaves a daughter, Mrs. Edgar J. Howes.

W. Manton Dailey, for many years general manager of the American Seamless Wire Co., of Providence, R. I., died on Jan. 11 of heart failure. Mr. Dailey recently organized the American Wire & Supply Co., of Attleborough, Mass. He was 56 years old.

Charles Eldredge, one of the owners and secretary of the Russel, Burdsell & Ward Bolt & Nut Co., Port Chester, N. Y., died Jan. 10 at his home at Rye, N. Y., aged 50. He was a graduate of Columbia University where he was a prominent athlete.

Charles Hubbard, aged 26, chief engineer of the Taylor Coal & Coke Co., was killed Jan. 11 by a fall of slate at the works near Uniontown, Pa.

David Barclay Little, for 19 years purchasing agent for the Union Switch & Signal Co., died recently at his home at Swissvale, Pa. He was 43 years of age.

William H. Harris, for 35 years interested in the radiator and heater business at Buffalo, N. Y., and in iron manufacture in that city, died Jan. 4 at the age of 75.

Cal Hirsch, president of the Cal Hirsch & Sons Iron & Rail Co., St. Louis, Mo., died Jan. 10 at the age of 73. He was one of the first railway supply dealers to import iron rails.

Herman Shacklebeck, one of the best know mine foremen in the Connellsville region, was instantly killed Jan. 11 in the wreck of a string of mine cars at the Griffin plant of the Bessemer Coal & Coke Co.

The Home of the Walrath Gas Engine.

BY AN EDITORIAL REPRESENTATIVE OF THE IRON TRADE REVIEW.

The Walrath gas engine is manufactured by the Marinette Gas Engine Co., of Chicago Heights, Ill. The company was formerly located in Marinette, Wis., but about two years ago it purchased a property which it now owns in Chicago Heights, enlarged it, and moved the business. Before going into a description of the plant, it will be interesting to examine this well-known gas engine.

The engine is built in three styles, all of the vertical type and having one, two and three cylinders. The engine is a four-cycle machine and is adapted to both stationary and portable work. It has been largely used for electric lighting, being either belted or direct connected to the generator. The base of the engine is cast in one piece and is bored to receive the cylinder, crank and cam shaft bearings. The bottom is planed level to insure a perfect alignment of the engine when installed. The main bearings are cast separate from the base and are turned up together on an arbor, and are then fitted in a corresponding part of a circular bore made to receive them in the base. This is done in order to insure perfect alignment of the crank shaft. The cylinder or cylinders, depending upon the type, are bolted to the top of the base and are set in a counter-bore which is made to receive them. Each cylinder is cast separate and all are water-jacketed. In the cylinder head are placed cages which contain the valves. These valves may be taken out for regrinding or for cleaning without disturbing the cylinder head or any of its connections. The multiple cylinder engines are so designed that any one of the cylinders may be cut out while running, thus enabling the valves or igniter blocks to be changed without stopping the engine. The valves themselves are of the poppet type and each cylinder is provided with one for inlet and one for exhaust. The valves are positive driven and lift vertically. The igniter used on the engine is of the make-and-break type and consists of a casting which holds two electrodes, one of which is stationary and insulated from the main body of the casting. The movable electrode is operated by a cam on the cam shaft. The governor of the engine is of the fly-ball throttling type and is positive driven from the cam shaft by means of bevel gears. The governor valve is of the piston type and is so designed as to control the volume of mixture, in proportion to the load it is carrying. This method of governing gives an impulse every second revolution in the one cylinder type of engine, and every revolution in the two cylinder type and every two-thirds of a revolution in the three cylinder type of engine, irrespective of the load being carried. The crank connections of the engine are splash lubricated, the base of the engine acting as an oil tank. In addition to this the main bearings are lubricated from oil cups. The valve operating mechanism is very simple. It consists of a single shaft on all three types of engines, which is geared down to half the number of revolutions of the crank shaft. This shaft carries the cams which operate the valves and igniters for the respective cylinders. The cams and rollers are case hardened. The complete engine is shown in a number of the accompanying illustrations on the testing block, which will be described more fully further on.

The plant where this engine is manufactured is shown in Fig. 1. It consists of three main buildings arranged parallel to each other, and one smaller building at the back. The three buildings in their order are the machine shop, which is in the foreground of the illustration, the foundry and pattern shop. The building at the rear is used for a blacksmith shop All the buildings are built of brick and are of modern mill construction. They are one story high and have a monitor roof for light and ventilation.

FIG. 1.—EXTERIOR OF MARINETTE GAS ENGINE CO.

The Pattern Shop.

The pattern shop is divided by a fire wall into two sections, only the rear half being for pattern work. The front portion at present is vacant, but the company contemplates using it in the near future for the manufacture of accessories to the engine. Another fire wall across this building divides the pattern shop from a boiler room which contains a horizontal tubular boiler used for heating the plant. This is the only purpose for which steam is used throughout the works. The main portion of the building is 90 x 250 feet, the boiler room section being 70 x 90 feet. The pattern shop equipment consists of a planer, two buzz saws, one jig saw and a band saw. The patterns for the engines have nearly all been standardized, and the force now employed in the

pattern shop is not very large. At present they are mainly engaged in patterns for larger sizes of engine than those which the company has as yet produced.

Foundry.

The next building is the foundry which is 100 x 200 feet. The interior is shown in Fig. 2. The foundry contains a 20-ton cupola, blast for which is furnished by a No. 8 Sturtevant fan located on the charging floor, and driven by an electic motor. The cores used are made in a room about 20 x 20 feet, adjoining the foundry, and located between it and the pattern shop. They are baked in a large core oven about 10 feet square and 8 feet high, which is heated by a coke fire in a furnace outside the oven. This oven is also between the foundry and the pattern shop and adjoins the core room. Running from the foundry into the oven is a double track on which are carried four-wheel cars built of I-beams and steel plates. The larger cores, as those for engine bases etc., are made directly on the car, which is then pushed into the oven, the core remaining on the car until it is baked. The foundry is served by two hand operated revolving jib cranes, which provide ample facilities for pouring and handling the larger castings. The molds for these are made in the sand on the floor, while the molds for the smaller parts are made in snap flasks.

The front wall of the foundry is extended across to that of the pattern shop and the space between the two buildings is covered, forming a storage shed for iron and coke. After the castings have been removed from the sand they are transferred by means of narrow gauge cars to a room at the rear of the foundry where they are cleaned and tumbled. After cleaning they are transferred to another narrow gauge car and thence to the machine shop. The larger castings are picked up by the crane in the machine shop and transferred to any desired machine in order to be finished. The crane is a 15-ton traveling electric.

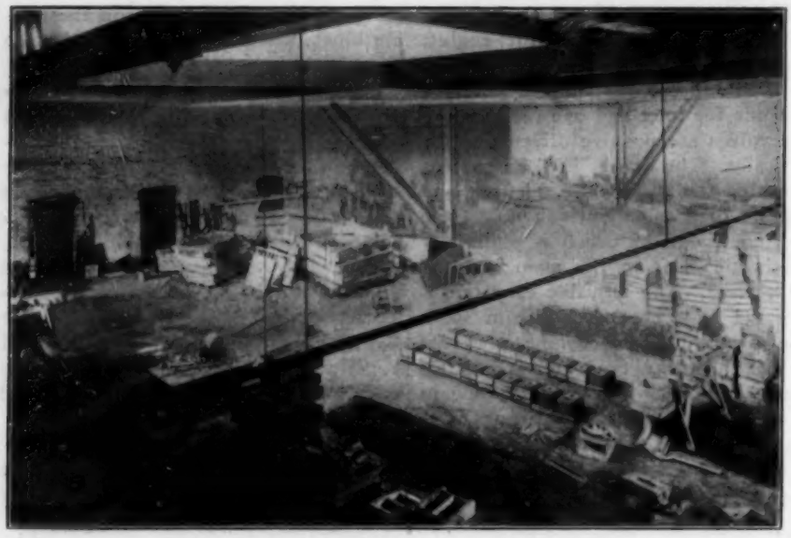


FIG. 2.—VIEW OF FOUNDRY.

The Machine Shop.

The machine shop is a building of the same general construction as the others, 120 x 270 feet. It is divided into three bays, the lighter machines being in the exterior bays, while the heavier machines are located along the edges of the middle bay. The center of this bay is kept clear of machines and is used for erecting engines. Along one edge of the central bay for about one-half the length of the shop is the testing block, on which every engine is run under load for at least two or three days. The front end of one of the outer bays is fenced off to form the tool room, a view of which is shown in one of the accompanying illustrations. The equipment of the tool room consists of two universal milling machines, two lathes, a universal grinding machine and a Brown & Sharpe automatic gear cutter, on which all the gears used in the valve mechanism of the engine are cut. All important operations on the engine are accomplished with jigs which are all made in this room and are stored in another room immediately adjoining it, where are also stored the small tools used in the works. The tools and jigs are checked out to the men according to the ordinary system used in most tool rooms.

At the rear of the tool room are some of the heavier tools. These consist of two nine-foot boring mills, on which the bases of the engine are faced up, and the counterbores in which the cylinder is mounted, are finished. After being faced both top and bottom, the bases are taken to two radial drills and the bolt holes for the cylinder studs are drilled and tapped. A jig is used which fits in the counterbore, thus insuring perfect interchangeability between the cylinders and bases in any given class of engine. The engine cylinders are bored on a horizontal boring machine and afterwards reamed, there being a complete equipment of reamers for all sizes of cylinders which are made. The cylinders, the pistons and the cylinder heads are all made from semi-steel.

FIG. 3.—TOOL ROOM.

In the same bay with these tools, and against the wall is a 60 horsepower,

FIG. 4.—INTERIOR OF MACHINE SHOP.

three cylinder gas engine which furnishes power for the shop. On the opposite side of the central bay from these tools are located the heavy planers and the crank turning lathe. There are several planers, all large machines, the largest being 72 x 72 inches by 16 feet. This machine has four heads and double attachments, and four bases of the largest sized engine can be placed on it at one time.

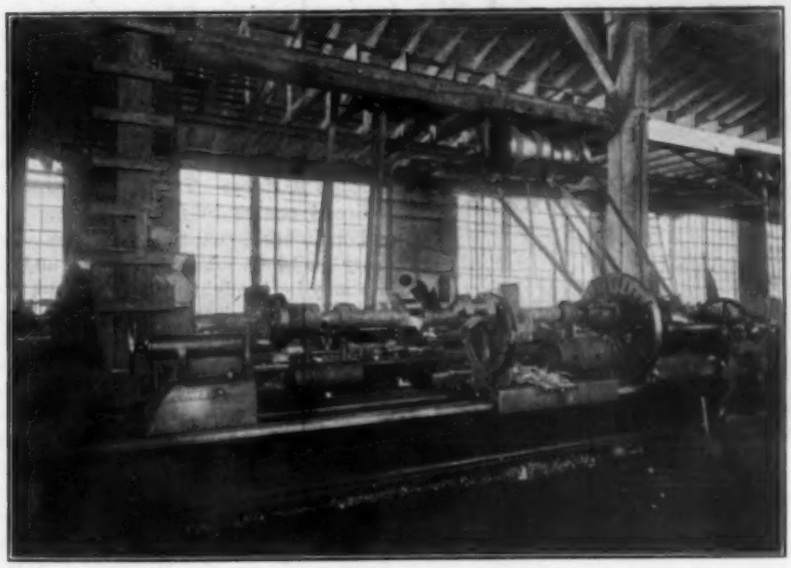


FIG. 5.—LATHE FOR TURNING CRANKS.

The device used for turning the cranks is shown in one of the illustrations. As shown it is turning up a three-throw crank. A disc with three centers 120 degrees apart is placed on each end of the shaft, the centers corresponding with the center line of the cranks. Counterweights are placed in the crank shaft in the proper position to balance the cranks, being moved in or out from the shaft by means of screws. A center steady rest is placed around the shaft, immediately adjoining the crank being turned. This device is very efficient and the cranks are turned rapidly and accurately. It may be here mentioned that all the crank shafts are forged in one piece and afterwards worked up to shape in this lathe. All the bearings on the engine, excepting the crank shaft are case hardened and afterwards ground.

The bay opposite that in which the tool room is located is occupied principally by lathes and turret lathes and such other light tools as shapers,

grinders, etc., and by experimental apparatus. The company is constantly experimenting on new features for the engine, and on different types of gas producers.

The engine after erection is taken to the testing block, which is shown in Fig. 6, and run under load in order to see that it fulfills the conditions required. The testing block consists of a series of castings, which are mounted on a concrete foundation. These castings are provided with T slots in which are placed bolts for fastening the standard which carries the engine under test. Two of these standards are shown in the accompanying illustration lying on the floor and others are shown in position under the engine mounted on the block. The engine after being mounted is started by means of compressed air, connections for which are provided at intervals along the block. In the illustration the armored hose leading from the engine to the floor is used to carry the compressed air for starting. Gasoline is the fuel used for testing the engine, when it is to operate on gasoline, it being supplied from the tank shown in the accompanying illustration. It is forced into the cylinders by means of a pump driven from the cam shaft of the engine. The load is furnished by a Prony brake and also by a portable generator belted to the engine as shown. The energy developed by the generator is absorbed in a water rheostat which is located outside the building or in a bank of incandescent lamps which may be seen immediately below the roof and above the engine under test. A switchboard clearly shown carries the measuring instrument and switches. The exhaust gas and the jacket water of the engine are discharged through pipes which are led across the room and out of the window. When it is desired to run an engine on producer gas, connection is made with a gas producer which is located between the foundry and the machine shop. The company is experimenting on other producers of various types, and at the time of the writer's visit an engine was being run on a producer which was designed to furnish gas from crude oil. This producer is shown in the illustration Fig. 7, and we hope at an early date to be able give more details of this very interesting piece of apparatus.

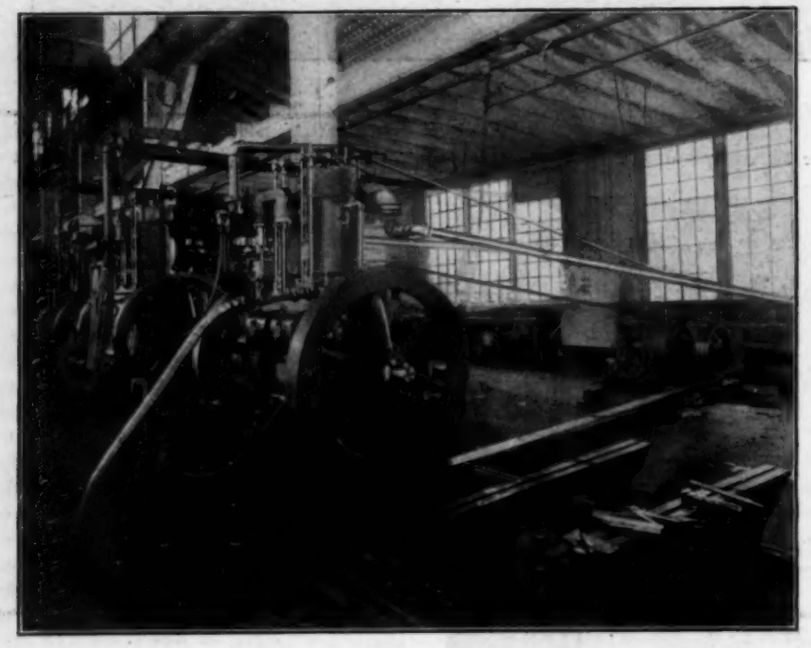


FIG. 6.—ENGINES ON TESTING BLOCK.

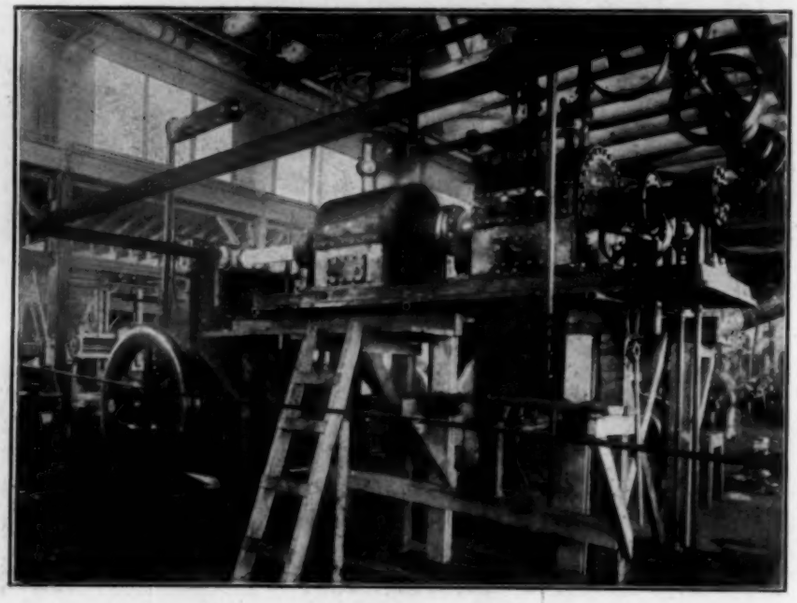


FIG. 7.—EXPERIMENTAL PRODUCER.

One thing noticeable about the shop was the absence of chipping. The jig system is so complete that it is very hard for a man to make a piece wrong, and as a result the engines go together with but very little fitting.

The Blacksmith Shop.

The blacksmith shop at the rear of the machine shop, is a building 60 x 70 feet. It contains two forges and a belt driven power hammer which is used for forging up the crank shafts of the engine. All the other forgings on the engine are small and are hand forged.

The office and drafting room of the company is located on the second floor of the machine shop. The works have excellent facilities for shipping. The Chicago Heights Terminal Transfer Railroad passes in front of the plant and switches from this road run into every building. Thus the raw materials may be brought in on cars and unloaded directly into the storage sheds adjoining the foundry, while the completed engine may be picked up by the crane in the machine shop and placed in the car for shipment to its destination. The transfer railroad makes connections with all the lines entering Chicago. In addition to the facilities afforded by this road, side tracks are run in directly from the Chicago & Eastern Illinois, the Michigan Central, Southern Indiana, and Elgin, Joliet & Eastern roads.

TECHNICAL STUDENTS ARE INCREASING

New Engineering Buildings and Apparatus

An article written by Prof. Rudolf Tombo Jr., of Columbia University, part of which has been issued in pamphlet form, states, regarding the registration statistics of technical students, that although the numbers matriculated in various universities and colleges, are not noticeably greater than in previous years, the proportion of scientific students is largely increased. At Princeton, he states, the number of scientific students has come to be equal to that of academic students, whereas but three years ago there were 264 more of the latter. At Yale also the same condition is true where a plurality of 445 academic students has been reduced in the past three years to 295. With this great increase, however, the rate of gain has fallen off somewhat owing to the counter influnce which a fear of too large a supply of technical men has created. The institutions providing technical courses rank in numbers of those registering as follows: Cornell, Michigan, Yale and Illinois.

University of Washington.

A new testing laboratory is being installed in the civil engineering department. Among the new pieces of apparatus will be a 200,000 pound Olsen testing machine with extensions and complete equipment for testing beams up to lengths of 16 feet, a 30,000 pound Olsen machine and a Riehle shot-cement testing machine. In addition to these the department is already equipped with a 100,000 pound Riehle machine.

The mining engineering department has just installed two coke muffle furnaces made by the Denver Fire Plate Co., for assaying work. A quantity of ore samples exhibited at the Portland exhibition has been received by the school of mines, which was also awarded a gold medal for its exhibition at the Lewis and Clark Exposition.

Mississippi Agricultural and Mechanical College.

The school of engineering of the Mississippi Agricultural and Mechanical College, of which department B. M. Walker is the director, has just had completed its new engineering building erected at a cost of $30,000. The new building which was erected under the direct superintendence of members of the engineering faculty is a modern structure of pressed brick. The main section extends east and west, is three stories high and 60 x 122 feet. The north wing is 75 x 92 feet, and the east wing 60 x 54. The two remaining sections of the building are 74 x 102 feet

B. M. WALKER, DIRECTOR.

and 60 x 92 feet. The entire floor space covers 1⅛ acres and is devoted entirely to recitation work. The entire building

NEW ENGINEERING BUILDING, MISSISSIPPI AGRICULTURAL AND MECHANICAL COLLEGE.

is heated by steam and lighted by electricity.

The engineering department of the school comprises four branches, mechanical, electrical, civil and mining engineering. In each of these courses instruction is given and work required leading to the degree of bachelor of science, in order to obtain which an original thesis is also necessary.

Worcester Polytechnic Institute.

Professor C. M. Allen, Mr. H. P. Fairfield, and Mr. E. H. Fish, of the mechanical engineering department, were in attendance at the recent meeting of the American Society of Mechanical Engeers in New York.

A Jackson belt lacing machine has just been added to the equipment of the Washburn Shops. This machine serves the double purpose of lacing the shop belts, which it does by a wire lacing, and also of enabling the instructors to conduct a series of tests on the relative holding power of the different styles of lacings.

Contracts have just been let for the second generating unit, of 40 kilowatts capacity for the new power laboratory. The first unit of 105 kilowatts capacity has just been installed. The engine for the new unit is to be a 7 inches x 13 inches x 10 inches vertical cross compound engine manufactured by the Revere Engine Co., of Trenton, N. J., and the 40 kilowatts generator to which it is to be direct connected will be supplied by the Westinghouse company. The generator will deliver 2 phase, 60 cycle, 220 volt alternating current and will be arranged for parallel operation with the first unit. The exciter of the generator just purchased will be direct connected, the one for the 105 kilowatt generator being motor driven.

The Electro-Dynamic Co., of Bayonne, N. J., has made an indefinite loan to the electrical engineering department of a 5 horsepower 220 volt "interpole" variable speed motor suitable for speeds varying from 275 to 1,100 revolutions per minute. The motor is accompanied by a controller and is "loaned to the department for testing purposes," this being practically equivalent to a gift, as the company says that it will set no time for the return of the machine.

President Engler and Professor Allen of the Institute were guests at the recent regular meeting of the New York Alumni Association.

Connection has been made through a 15 kilowatt transformer between the Worcester Electric Light Co.'s circuits and the new switchboard in the power laboratory at the Institute which will make possible the use of power from the electric light company at times when a small amount of light or power is necessary when the Institute plant is not running.

The new 175 horsepower Westing-

house compound engine which was recently installed in the power laboratory was started for the first time on last Wednesday, and the 105 kilowatt generator, to which it is directly connected, delivered its first power to the various buildings on the campus at that time. Test runs are now being made with this equipment for the purpose of demonstrating the manufacturer's compliance with the specifications. The Westinghouse company is represented by one of its engineers who will remain at the Institute while these tests are being made. The initial runs seem to indicate that the unit will be perfectly satisfactory.

Dr. A. W. Ewell presented a paper on "The Electrical Production of Ozone" at the meeting of the American Physical Society held at Columbia University, New York, Dec. 29. During the past two years Dr. Ewell has made an extended investigation along the lines of this subject beginning his work in Germany and continuing it since his return to this country. The paper read at the meeting of the American Physical Society embodied the results of his most recent work which was conducted in the high potential laboratory at the Institute.

Mr. H. S. Downe, of the class of 1882, who has for many years been manager of the English branch of the American Radiator Co., announces that this company will erect manufacturing works in Hull, England. Under Mr. Downe's management the business of the company has increased to such an extent that it is now deemed advisable to build a factory in England.

Changes in Mining Positions.—Effective Jan. 1, a large number of promotions and changes were made in the management of the ore mines of the United States Steel Corporation. J. H. Hearding was promoted from superintendent to general superintendent of the Adams-Spruce mine, and R. R. Trzona from superintendent to general superintendent of the Fayal. Thos. Bavey was advanced from mining captain to superintendent of the Adams-Spruce, and George H. Dorner from chief clerk to superintendent of the Fayal, John Corbett, shift-boss at the Adams-Spruce, succeeding the former, and Wm. Plummer, the latter.

The iron foundry established by the Japanese government at Edamitsu, near Moji, Japan, has been enlarged and improved to such an extent that authorities believe it can care for the local demand, especially in rails. Its present output is 70,000 tons per annum. It is soon to begin the manufacture of telegraph wire and railway carriage iron.

PLANTS PROJECTED IN DECEMBER, 1905.

Below will be found a list of rolling mills, steel works, and tinplate and terne plate plants which were projected in December, 1905 as compiled by the American Iron and Steel association:

Rolling Mills and Steel Works.

New England Steel Castings Co., Trenton, New Jersey. Contemplates erecting works for the manufacture of special steel castings.

Baldwin, F. L., Portsmouth, Ohio, Interested in a company which proposes to erect at Portsmouth, one 24-pot crucible steel-melting furnace and 3 steam tilting hammers (one 800 pound, one 1,000 pound, and one 4,000 pound); product, high speed steel and steel castings; estimated annual capacity, 920 tons. Fuel to be used, coal and natural gas.

Bucyrus (The) Steel Casting Co., Bucyrus, Ohio. Contemplates erecting one 20-gross-ton basic open-hearth steel furnace; product, steel castings; estimated annual capacity, 12,000 tons. Fuel, natural gas and oil. Work will probably be commenced in the winter of 1905-6.

Keystone Steel Co., Sebring, Ohio. Contemplates engaging in the manufacture of steel by a special process at Sebring.

Lee (The) and Rieske Co., Loveland, Ohio. Contemplates engaging in the manufacture of crucible steel; product, to be Bixby's patent couplings and other steel castings.

Steel (The) Foundry Co., Cincinnati, Ohio. Contemplates erecting one 10-gross-ton acid open-hearth steel furnace with an annual capacity of 4,200 tons of castings. Fuel, oil.

Ward-Dickey Steel Co., Indiana Harbor, Ind. Works equipped for the manufacture of hammered planished sheet steel; contemplates adding trains of hot rolls.

Flagler Iron & Steel Co., Chicago Highlands, Ill. Building works for the manufacture of lap-weld boiler tubes and pipe; may add trains of hot rolls in 1906. Tube works will probably be completed in January, 1906.

Peoria Steel & Tool Co., Peoria, Ill. Commenced in 1904 the erection of a plant at Peoria, Ill., to be equipped for the manufacture of crucible steel and hot rolled iron and steel; buildings completed in December, 1905. Construction suspended; no machinery installed; property for sale.

Carroll (The) Foundry, Houghton, Mich. Contemplates adding one 2-gross-ton Tropenas converter for the manufacture of steel castings for mining and milling use.

Monarch Coupler Co., Ltd., Detroit, Mich. To begin the erection at Delray, the manufacture of steel couplers and knuckles; annual capacity, 6,000 tons. Fuel, oil. May be completed by May 1.

Vulcan (The) Iron Works, Seattle, Washington. Now manufacture machinery and iron and steel bolts and nuts; contemplate adding trains of hot rolls in 1906.

Abner Doble Co., San Francisco, Cal. Contemplates erecting one 10-gross-ton basic open-hearth steel furnace in the Potrero; product, steel castings; annual capacity, 6,000 tons. Fuel, California crude oil.

Tinplate and Terne Plate Plant.

Atlanta Rolling Mill and Tin Plate Co., Atlanta, Ind. May add to its rolling mill at Atlanta, a plant for the manufacture of tinplates and terne plates; 6 sets will probably be installed; weekly capacity, 5,200 boxes. Work may be commenced early in 1906.

A WRONG IDEA OF EFFICIENCY.

Mr. J. Swinburne, late president of the British Institute of Electrical Engineers, made the following statement in one of his recent addresses. "If one of us does $750.00 worth of work a year and earns $500.00 he is efficient. If he only does $450.00 worth of work he is an inefficient machine and will come to grief. He is like a 90 kilowatt alternator, which takes 1,000 kilowatts to excite although the analogy is not close. If he does $75,000.00 worth of work and gets $50,000.000 he is an efficient machine of much larger size and his efficiency is much more satisfactory to himself. I may mention in passing that an efficient man must do more work than he is paid for. This is not always realized. The man that does only that work that he is paid for will be no use to the world at large. His efficiency is zero, his consumption being equal to this output. The man who does $75,000.00 worth of work and gets $50,000.00 consumes two-thirds of the work himself, so that his efficiency is 33 per cent, which is very high even for an engineer."

It would seem that in the above quotation Mr. Swinburne has made a curious mistake in rating the efficiency of the high priced man at 33 per cent. Efficiency is defined by electrical engineers as the ratio of the output to the input. In this case the efficiency of the man would be $\frac{75\,000}{50,000} = 150$ per cent, instead of 33 per cent. The method of rating his efficiency should be like the method of rating the increased crop of wheat from the seed rather than the method used in rating engines.

BEHAVIOR OF MATERIALS OF CONSTRUCTION UNDER PURE SHEAR*.

BY E. G. IZOD.

The experiments given in this paper were carried out at University college engineering laboratory, and were undertaken in the first case to investigate the effect of shear on cast iron, concerning which there seemed rather a lack of data, and these proving useful they were extended to embrace a somewhat wider field. The main stumbling block in experiments on shear seems to be that bending, or stretching of the outer fibres in the specimens tested, cannot be entirely eliminated, and to remedy this as far as possible a particular form of shearing apparatus has been used.

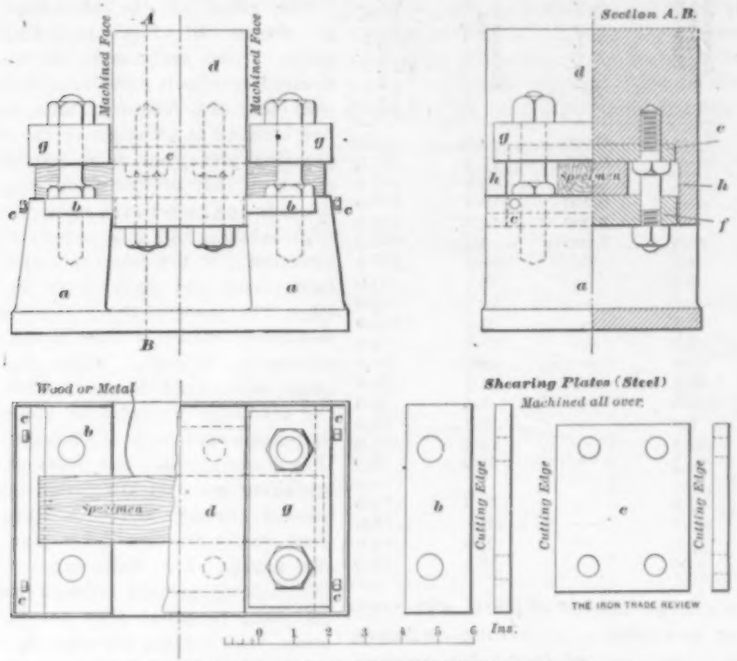


FIG. 1.—PLAN AND ELEVATIONS OF TESTING MACHINE.

The apparatus is shown in Fig. 1, in which *a* is a stiff cast-iron body composed of two projecting supports, which are cast in one with the bedplate. These supports carry hardened steel plates *bb* with edges ground for cutting edges; these side plates are screwed to the supports by the holding-down bolts which grip the specimen, the edges being spaced exactly 4 inches apart, which is the general span adopted for the experiments. The plates are capable of fine adjustment by the means of the small set-screws *cccc*. Between these side plates another cast-iron block, *d*, slides, which also holds a steel plate *e* with cutting edges; this middle plate exactly fits between the two side plates so that the opposite edges shall induce as near perfect shear as possible. The specimen is then screwed down to the middle plate by means of a cap and holding-down bolts, as shown in Fig. 8, and the projecting ends placed on the two side plates and held firmly by the caps *g* and side bolts; the whole apparatus is then placed between the compression plates of the testing machine, and the tests carried out in the usual manner. The projecting lugs *h* served as guides to ensure the middle block *d* moving fairly between the side plates. The apparatus is shown in the testing machine in Fig. 9. The testing machine used was a 100,000 pounds Greenwood and Batley horizontal machine, and all the jockey weights were carefully calibrated. The specimens used were as nearly alike as could possibly be obtained, but a great deal depended on the form in which the material was supplied, this varying with different makers; in all cases a rectangular section was used for the shearing tests, while for the tensile tests a general rule was followed where possible for the flat and round round specimens.

Several experiments were made in the early stages to determine the effect of form or shape of section on the ultimate shear stress, which perhaps deserves a passing mention. A mild steel bar was taken and specimens cut from it consecutively, and treated in a different manner as regards the shearing area, such as:

(1) Nicked with various widths of cutting tool.
(2) Fine saw cuts to various depths.
(3) Turned grooves with various radii at the bottom.
(4) Recesses machined for the knife-edges, etc.

These gave results practically identical with those from the plain bar, so that the rectangular sections as tested could be relied upon to give satisfactory results and an accurate measure of the ultimate shear strength for all materials.

A summary of all the results obtained is shown in table 1, and plotted against Materials Base in Fig. 2. Each of $\frac{l}{d} = 3.54$.

figure in the table is the mean of a large number of separate tests; where the elongation percentage is given, it is the corrected elongation percentage for a standard bar 2 inches long and 9-16 inch diameter, having therefore a ratio

Ultimate tensile stress is designated

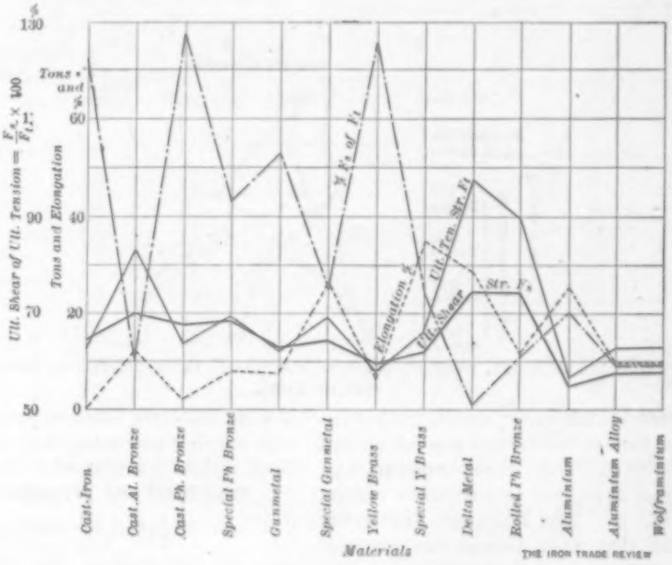


FIG. 2.—RESULTS PLOTTED ON "MATERIALS BASE."

*Abstract of a paper presented at the Institution of Mechanical Engineers, England, Dec. 5, 1905.

by F_t and ultimate shear stress is designated by F_s.

Cast Iron.

Four brands were tested, and the mean results give a higher ultimate shear stress for cast iron than is generally accepted; the average for all brands being 14.9 tons per square inch, while in several cases it exceeded 16.0 tons. An attempt was made to establish a rule as a guide to the ratio $\frac{F_s}{F_t}$ but this ratio did not seem to be dependent on any of the other results observed. Though the variation with different brands is not great, yet it cannot be said to follow any law which can be deduced from these experiments. Analysis is plotted against these results in Fig. 5. The fractured specimens showed that, even though the material was well supported round the knife-edges by the holding-down caps, yet a local stretching took place in the outer skin, in this case of course showing as a slight crack across the specimen about ⅛ inch from the shearing plane. It was observed also that the fracture line took the form of an S bend with the bulge towards the knife-edge as shown in Fig. 10.

TABLE I.

Material.	Ultimate Tensile Stress. Tons per sq. in. = F_t.	Elongation Percentage on Standard.	Stretch Modulus E. Tons per sq. in.	Ultimate Shear Stress. Tons per sq. in. = F_s.	Per cent. of Ultimate Shear of Ultimate Tensile Stress = $\frac{F_s}{F_t} \times 100$.
Cast Iron. A	9.7	—	6,000	14.8	152.0
Cast Iron. B	13.4	—	8,300	17.4	111.0
Cast Iron. C	11.3	—	5,700	13.9	122.0
Cast Iron. D_1	13.7	—	6,200	16.1	118.0
Cast Iron. D_2	13.5	—	5,900	14.8	110.0
Cast Aluminum-Bronze	33.1	12.5	7,600	19.9	60.0
Cast Phosphor-Bronze	13.4	2.2	—	17.2	128.0
Special Cast Phosphor-Bronze	19.7	8.0	—	18.4	93.0
Gun metal	12.1	7.8	—	12.5	103.0
Yellow Brass	7.5	6.5	—	9.4	126.0
Special Yellow Brass	16.0	35.0	—	11.8	74.0
Rolled Phosphor-Bronze	39.5	11.7	—	24.2	61.0
Aluminum	6.4	25.5	—	4.5	70.0
Aluminum Alloy	12.7	9.6	—	7.5	59.0
Wolframinium	12.6	9.2	—	7.5	59.0
Wrought-Iron Bar	26.0	22.5	—	19.4	75.0
Mild-Steel Plate 0.14 Carbon	26.9	34.7	—	21.0	78.0
Swedish Crucible Steel:—					
0.12 Carbon	24.9	43.0	—	18.5	74.0
0.48 Carbon	42.1	26.0	—	28.8	68.0
0.71 Carbon	56.3	15.0	—	36.6	65.0
0.77 Carbon	61.3	11.0	—	38.3	62.0

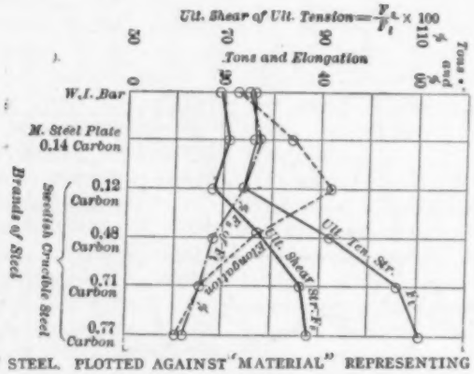


FIG. 3.—RESULTS ON STEEL. PLOTTED AGAINST "MATERIAL" REPRESENTING VARIOUS QUALITIES OF STEEL.

On a large number of steels with varying percentages of carbon, including the higher carbon steels; but unfortunately steel makers, who would have supplied a series of test pieces with their proportionate analyses, were not able to furnish them at the last minute, consequently the experiments are not so complete as they might be. The author was enabled to include however a series of tests on some Swedish crucible steel, with varying percentages of carbon, and these results are plotted in Fig. 4. Con-

Mild Steel and Wrought Iron.

It was intended to make these tests trary to expectation, the ratio $\frac{F_s}{F_t}$ decreased as the carbon content increased; but the author is inclined to think that this confirms the deductions arrived at from the curve in Fig. 6 and explained later, namely, that as the ratio $\frac{F_s}{F_t}$ falls from 80 to 60 per cent the elongation percentage also decreases, whereas, if the elongation dropped considerably lower than 10 per cent, as might be expected with higher carbon steels, the ratio $\frac{F_s}{F_t}$ would be proportionately higher.

The effect of the shearing action is shown in Fig. 12, which are pieces from each end of the half-sheared specimen exhibited. It can be seen that the fracture starts along a line inclined at an angle to the vertical shearing plane, but in an opposite direction to that of cast iron, which was towards and under each respective knife edge, while in this case of mild steel the direction is to the other side of the vertical plane, and away from the knife-edge. The cause of the projecting ledge mentioned above is most probably explained as follows: When the knife-edges move towards one another under the gradually applied load, the fracture line starts obliquely from each, and as they come together the fibres of the intervening material are compressed and twisted through nearly a right angle until finally fracture takes place along the fibres. The knife-edges separate this isolated portion through the vertical plane in which they are forced to move, thus making the ridge mentioned, the front of which is due to the cutting action of the knife-edge, while the back is due to the primary fracture line at the commencement of the load. This experiment also showed that it was practically impossible to prevent a certain amount of stretching of the top fibres in shearing tests, as, though the material was well supported by the holding-down caps, these fibres were affected for ½ inch each side of the shearing plane, as shown by the inclination of the top portion of the vertical lines; this stretching or bending is due to the fact that, when the load comes on the specimen, a certain amount of

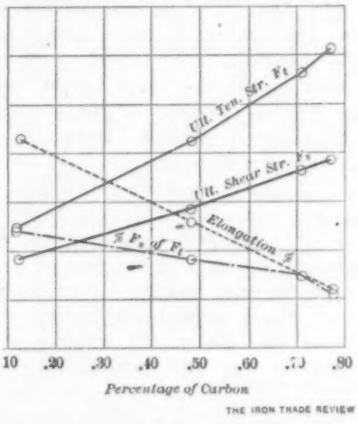


FIG. 4.—RESULTS ON SWEDISH CRUCIBLE STEEL WITH VARYING PERCENTAGES OF CARBON.

compression takes place before any fracture occurs, which brings the matrial away from the holding-down caps, and so leaves it to a certain extent unsupported and free to stretch.

Woods.

Four kinds of woods were used for these tests.

(1) Pollard oak.
(2) Yellow deal.
(3) Yellow pine.
(4) Teak.

From a selected board of each, specimens for tension and shear were cut alternately, in order to ensure any possible variation in the quality of the board being well distributed. The shear specimens were cut 8 inches by 2 inches by 1 inch, and tested along and across the grain. The results are given in table II.

On testing the woods in shear across the grain, it was observd that the specimen remained steady up to a certain load, and then sheared through about three-fourths of its shearing area, when it required a further increase of load, sometimes as much as twice the amount to completely shear the specimen; the author has named this the "crippling load," and it is shown more clearly in a shear stress-strain diagram, Fig. 7, which was drawn for a specimen of deal sheared across the grain. The exception to this is the case of oak, where no "crippling load" is really apparent, and which sheared through at its maximum load directly the center knife-edge commenced to move. In teak specimens sheared across the grain, the fibres did not hold together as in the other woods, but broke away from the main specimen at about ¾ inch from the shearing plane.

The percentage of moisture in each wood was obtained by carefully weighing the broken specimens, then placing them in a temperature of 212 degrees F. for 80 hours and weighing again immediately on removal. Towards the conclusion of the experiments it occurred to the author that the apparently pure double-shear, induced by the apparatus used, might not be simultaneous over the whole area, and to investigate the matter and an arrangement was adopted as follows: To the center block carrying the middle knife-edge a stiff steel beam was screwed, each end of which carried a steel pointer; to the crosspiece of the testing machine which carried the compression plate, two brackets were fixed which carried smoked iron plates, the steel pointers on the beams resting lightly on each, and were adjusted with springs to move without friction on the plates. The multiplying effect each side of the center block was, by means of the long steel beam, 16 to 1, that is, a movement of ⅛ inch on the pointer would mean a corresponding movement of the knife-edge of $\frac{1}{128}$ inch. A specimen was placed in shearing shackles and the whole just gripped between the compression plates sufficiently to prevent slipping; the steel beam was then screwed down to the center block, and the pointers adjusted to just rest lightly on the smoked plates. A zero line was then drawn on each plate at the place where the pointers rested; small increments of load were then put on, and each pointer

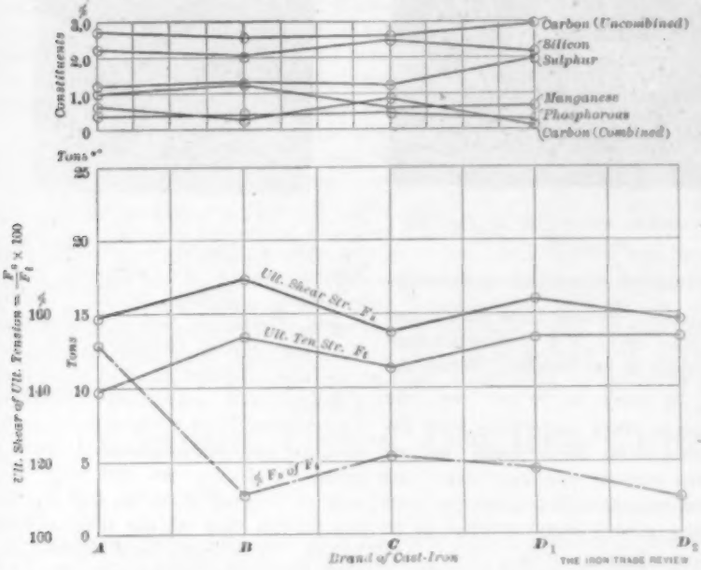


FIG. 5.—SHEAR AND TENSILE TESTS OF CAST IRON WITH ANALYSES OF DIFFERENT BRANDS. (IRON REPRESENTED BY DIFFERENCE).

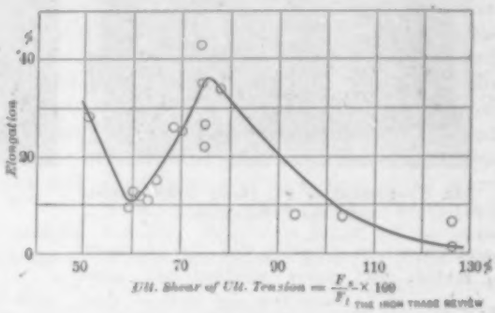


FIG. 6.—CURVE SHOWING POSSIBLE VARIATION OF ELONGATION PER CENT WITH RATIO.

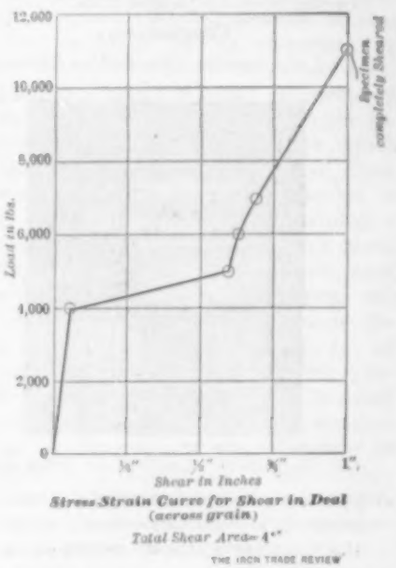

Load in lbs.
Specimen completely Sheared
Shear in Inches
Stress-Strain Curve for Shear in Deal (across grain)
Total Shear Area= 4"
THE IRON TRADE REVIEW

FIG. 7.—SHEAR STRESS—STRAIN DIAGRAM OF DEAL WOOD.

TABLE II.

Kind of Wood.	Weight of Cubic Foot.	Ultimate Tensile Stress per sq. in.		Across Grain Crippling Load per sq. in.	Ultimate Shear Stress per sq. in. Across Grain.	Ultimate Shear Stress per sq. in. Along Grain.	Percentage Crippling Load Across Grain of Ultimate Tensile Stress.	Percentage Ultimate Shear Stress Across Grain of Ultimate Tensile Stress.	Percentage Ultimate Shear Stress Along Grain of Ultimate Tensile Stress	Percentage of Moisture.
	Lbs.	Tons.		Lbs.	Lbs.	Lbs.				
Pine	39.5	9,176	4.09	1,930	4,872	470	21.0	53.0	5.12	15.7
Oak	47.7	15,993	7.14		5,292	891	—	33.0	5.5	12.6
Deal	26.46	7,834	3.49	1,195	2,668	442	15.2	34.0	5.6	10.6
Teak	45.0	9,807	4.37	2,764	3,960	1,022	28.2	40.4	10.4	10.0

carefully watched and the positions marked for the corresponding loads. It can be seen that should there be any tendency of the knife edges not to move absolutely in synchronism due to even a small failure of one side of the specimen before the other, the beam would immediately set itself at some small angle, and consequently the pointers would record the movement and locate it. This arrangement would also give a fairly accurate

FIG. 8.—SHEARING SHACKLES OPEN, SHOWING TEST SPECIMEN.

stress-strain diagram for any material tested, and some observations were taken on a specimen of yellow deal, from which the stress-strain curve, Fig. 7 was plotted. A specimen of mild steel bar tested with this gear on showed that the material remained perfectly steady up to half its maximum load, after which it began to shear, the movement of the knife edges being regular for successive increments of load until fracture took place. In all the experiments this arrangement showed that there was no tendency for one side to fail before the other, the shear being apparently simultaneous over the whole area.

Conclusions.

All the results obtained in these experiments seem to point to the fact that there is no common law connecting the ultimate shearing stress with the ultimate tensile stress, the ratio $\frac{Fs}{Ft}$ varying greatly with different materials. The test figures from crystalline materials, such as cast iron or those with very little or no elongation, seem to indicate that the ultimate shear stress exceeds the ultimate tensile stress by as much as 20 or 25 per cent, while from the fibrous materials, or, more properly speaking, those with a fairly high measure of ductility, the ultimate shear stress may be anything from 0 to 50 per cent less than the ultimate tensile stress.

A curve was drawn, Fig. 6, showing

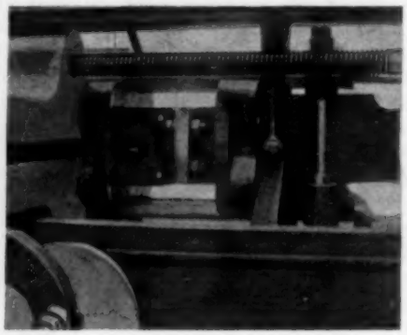


FIG. 9.—SHEAR APPARATUS IN TESTING MACHINE.

the variation of elongation percentage with the ratio $\frac{Fs}{Ft}$ and from this it can be seen that there is a certain amount of uniformity in the results. When the ratio $\frac{Fs}{Ft}$ is close to 60 per cent the elongation in every case shows very little variation from 10 per cent. Below, and above the 60 per cent ratio the elongation increases, that at 50 per cent ratio being almost equal to that at 70 percent, while from the 70 per cent ratio upwards the variation is inclined to be regular, the elongation decreasing as the ratio $\frac{Fs}{Ft}$ becomes higher, until with a very small or practically no elongation the ratio might be expected to reach 120 per cent or 130 per cent, that is, that the ultimate shear stress would exceed the ultimate tensile stress by 20 or 30 per cent. All the results obtained are shown plotted to a base of materials in Figs 2, 3, and 5.

PRICES OF 1905

As Shown by Chart Are Free From Violent Fluctuations of Earlier Years.

The chart which accompanies this issue, as a supplement, shows the fluctuations in the prices of iron and steel products during the months of 1905 and the ten preceding years. The figures on which the chart is based are the averages of weekly prices given in

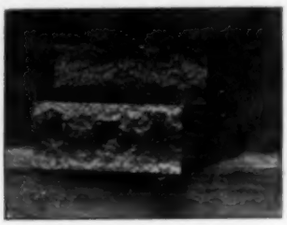


FIG. 10.—SHEAR FRACTURE OF CAST IRON.

the market reports of THE IRON TRADE REVIEW. They are computed for the following: Tank plates, Chicago; beams, Pittsburg; bar iron, Cleveland; Bessemer billets, Pittsburg; Bessemer pig iron, Pittsburg; No. 2, foundry, Chicago, and gray forge, Cincinnati. The vertical lines in the chart represent months and the horizontal lines the prices in dollars per net ton, in the case of finished material, and per gross ton in the case of pig iron and steel billets. The solid and broken lines traversing the diagram indicate the changes in monthly average prices, but do not, of course, show the extreme high or the extreme low price that may have been reached in some week of the month. In plotting the price curves, the pool prices are given for finished products so far as these prices were observed. Where concessions were made in fact, even though no change in the official price was made, the price established by actual transactions is

FIG. 11.—SHEAR FRACTURE OF MILD STEEL.

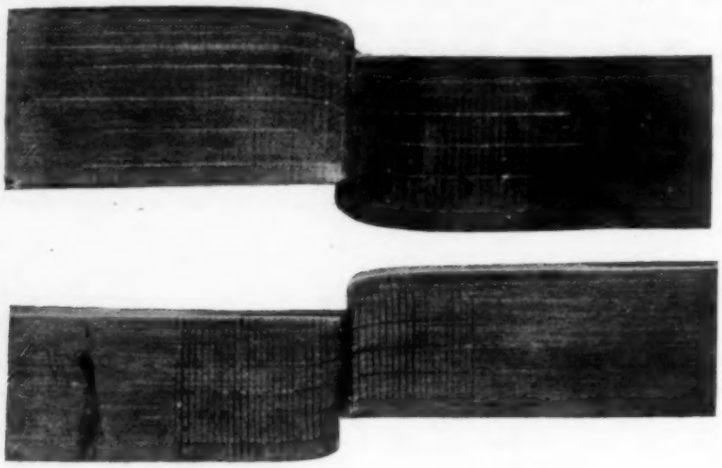


FIG. 12.—PARTLY SHEARED SPECIMENS OF MILD STEEL.

given. The chart shows the short-lived boom of 1895, which followed the dragging prices of a period of depression; then the decline in the latter part of 1895, followed by slow general declines of 1896 and 1897, and a rather steady trend of prices from the middle of 1897 until the fall of 1898; the rapid rise at the close of 1898, followed by the very high quotations of 1899; a sharp decline in 1900 and partial recovery at the close of that year. During the past five years the chart indicates that there were not such violent fluctuations as were experienced in the preceding six years. Perhaps the most striking feature is the fact that while prices have varied to a considerable extent, including the period of high prices in 1902 and 1903, there has been an increasing tendency to keep away from the extremely low quotations of 1897 and 1898, thereby furnishing evidence in support of the opinion entertained by many that we shall never again see prices touch as low points as they have in some periods of depression in the past. The year 1904 was noteworthy for the testimony it gave to the influence of manufacturers of finished materials in maintaining prices at moderate figures, and 1905 has added still stronger testimony. Towards the close of 1903 confidence in business conditions was very much disturbed, but it was restored in 1904, and the prosperity of 1905 naturally followed. In both years the heavy buying of railroads was an important factor. In 1903, owing to the difficulty in disposing of railroad securities, the railroads stopped all new work, and the buying for repairs was limited as much as possible. When in 1904 the railroads found it possible to obtain capital, they began to buy heavily, and this buying has continued in very large volume since that time. The table of monthly averages from which the lines of 1905 were plotted is a part of the supplement, as are also the tables for the nine preceding years.

The chart which has been printed in colors for the first time this year at considerable expense, is sent to all subscribers, and a few extra copies have been printed, and will be sent out on application in tubes to subscribers who desire to frame them.

In an editorial on "Iron and Steel in 1905," James N. Swank says:

"The year 1905 was not only the most productive and the most prosperous year in the history of the American iron trade but it was the most uniformly prosperous year. From January to December the demand for all leading forms of iron and steel and for the raw materials of their manufacture was continuous and insistent. There was no dull season, no overloading of the markets, no slump in prices. Upon the other hand there was no great scarcity of iron and steel at any time, the markets in the main were well supplied, and consequently there were no famine prices. Few orders were sent abroad and our export trade was not neglected. Production was abnormally and phenomenally great, but best of all prices were wisely kept within reasonable bounds. We have heard of no complaints that prices were too high. We estimate the year's production in round figures at about 43,000,000 tons of iron ore, 23,000,000 tons of pig iron, and over 3,000,000 tons of steel rails."

Cement Users Discuss Concrete Reinforcement.

(Special Correspondence.)

Milwaukee, Wis., Jan. 13.—The annual convention of the National Association of Cement Users, held here during the past week, was successful both in point of attendance, about 900 being present, and in interest. Night sessions supplemented the meetings during the convention days and the discussion of papers after reading, when section chairmen and others took the platform and catechized persons in the audience on the views they had expressed, brought out a great amount of information on a large number of varied topics.

"There has been some jealousy," said President Richard L. Humphrey, of Philadelphia, in a conversation with THE IRON TRADE REVIEW representative, "on the part of steel and structural iron men because of the growing use of cement, reinforced, as a substitute for the steel skeleton of buildings. That is passing away. They have come to realize that the steel used for reinforcement offers an additional consumption and a rapidly growing field for the disposal of products turned out by the mills, and have been influenced to cooperate in the development of this new line because of the increased sales of steel.

"Only the bold engineer is daring enough to put up an 18-story building, his more conservative colleague being satisfied with looking on and admiring his skill. But there are many other ways in which the steel and iron manufacturer has had his interest awakened. The purposes for which reinforced concrete is being used are becoming exceedingly numerous. Experiments are now being made to substitute concrete for wooden railroad ties. Motive power men do not like it because it is very rigid and racks the engines too violently. They are trying to overcome this by spiking hardwood blocks to the cement ties, thus affording a cushion that seems to be providing a successful solution of the problem. Instead of building dams of stone they are now making them in many places of steel reinforced concrete, building them hollow instead of solid. These so-called pneumatic dams are proving very effective. They are also making steel reinforced telegraph poles of cement.

"It is every day becoming more of a problem to many of the older blast furnaces of the country to know how to get rid of their slag. Heretofore most companies have had dumping grounds, but these have become filled and quite a number of concerns are making a business of utilizing this by-product with the admixture of limestone and other ingredients for the manufacture of cement. Furnace men are still studying the problem carefully, and I believe the cement men and the steel men are destined to come very close to each other in a wide field of activity which is just becoming well opened.

In the absence of E. B. Kelly of New York, who had been called to Cuba on business, W. W. Benson of that city, on behalf of the committee on machinery for cement users, read a report on "Cement Mixers." He declared that the successful company in the cement block line was the one which went into business along broad lines, with ample capital which enabled it to erect a proper plant containing a number of any of the standard block machines, a good system, mixers, sand screens, cars, crushers, tampers, etc.

Added reasons for failure were detailed by J. L. Mothershead Jr., of Indianapolis, who discussed the subject of "Waterproofing." He declared the first and foremost precaution against dampness or crumbling was to make good blocks, of honest material worked in an honest way and well-cured. He reviewed the various waterproofing processes at length.

Speaking briefly of the history of "Steel for Reinforcement," A. L. Johnson, a civil engineer of St. Louis, Mo., discussed the experiments made by Ransome in San Francisco on reinforced concrete beams.

"The vertical load on the rib for any given length," said Mr. Johnson, "is

carried by vertical shear in the concrete, and the rib is not acting as a column. If it were, in a case mentioned where the rib carried 1,200 pounds per lineal foot, supposing the rib to be 4 inches wide, this would give only a compressive stress in the rib of 25 pounds per square inch, and would be too small to be noticeable even if many times this amount.

"The ribs do not act as columns, but as beams, lengthening on the bottom and shortening on top;—it is the movement of the concrete lengthwise of the bar which the bar must be calculated to resist, and it is in this resistance that it begins to help carry the load and becomes an integral part of the structure. To offer reliable and satisfac-

PRESIDENT R. L. HUMPHREY.

tory resistance to this movement of the surrounding concrete along the bar, it is necessary for the bar to have on its surface projections, or depressions, the sides of which are nearly at right angles to the direction of the movement, which is to say, to the bar itself.

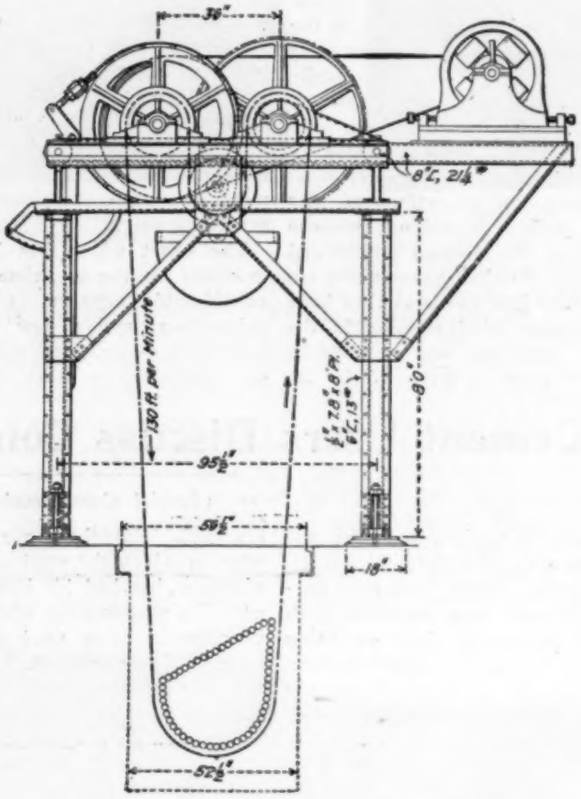
"Of course, the splitting action is of little effect until after the so-called adhesion of the concrete to the surface of the metal has been overcome. As a matter of fact, this resistance is made up of two parts, friction and a mechanical bond caused by the entering of the cement particles into microscopical pores on the surface of the metal, which particles have to be sheared off in withdrawing the bar. For short depths of embedment these two forces amount to about 500 pounds per square inch with bars of ordinary mill surface and good concrete, where perfect union exists between the cement and the metal. Of this, friction contributes about 25 pounds per square inch, the remaining 475 being due to the mechanical bond. While this bond is of a microscopical nature, its value is considerable, but a number of forces impair it, first among them shocks and vibrations, second keeping it constantly wet, in which case the bond may be cut down from 50 to 60 per cent in a year, and third, the reduction of the cross section by the working stress in the metal. which stretches it slightly.

"In specifying bars for reinforcement, there are a few fundamental principles that should be observed. In the matter of elastic limit the general proposition is that the elastic limit should be as high as is consistent with the ductility required by the case in hand, up to say 60,000 pounds per square inch. There is no object in having a higher elastic limit than this unless the nodules, too, could be raised, which is at the present time not feasible. Preference should be given to more bars of small section rather than to few bars of large section, as it is desirable to have the metal well distributed through the stretching concrete area. The bars should not be painted. A slight film of rust is no injury at all; but if the bars have been exposed long enough for scale to form, this must be removed before use.

"The working stress for the actual loads should be only one fourth of the elastic limit. Many of the municipal laws are in serious error in that respect.

"There are many formulae for the design of reinforced concrete beams, and it is not the speaker's intention to discuss them at this time. Many of these are based upon the ultimate strength of the bars instead of their elastic limit, which is a vicious practice, and should be prohibited by law."

The convention adopted a resolution asking Congress to make ample appropriation for the continuance of the investigation of cements, mortars and other structural materials being conducted by the geological survey. The decision was made to incorporate the association



END VIEW OF RYERSON FLUE CLEANING MACHINE.

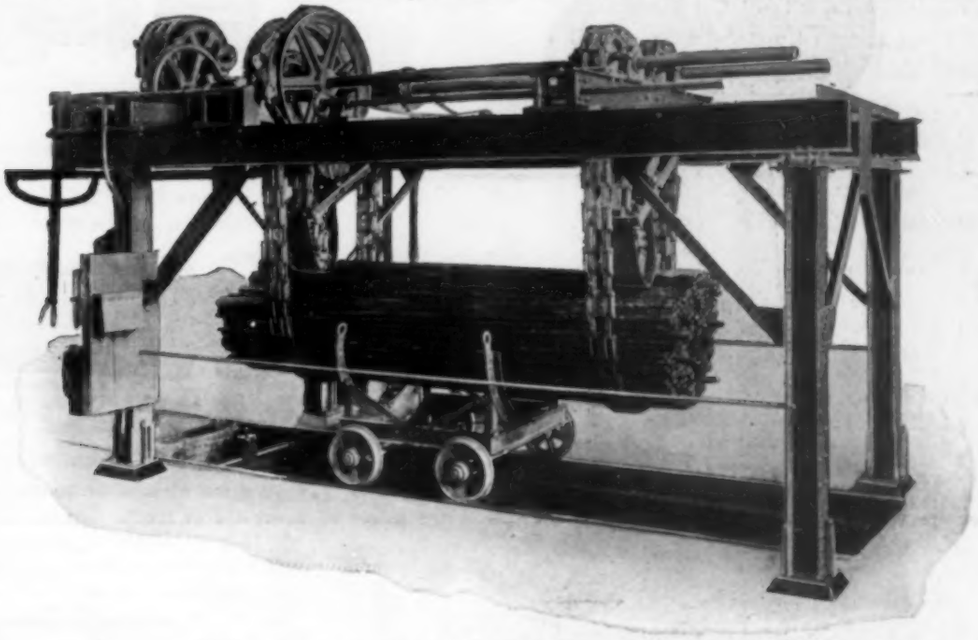
The officers elected were as follows: president, Richard L. Humphrey, Philadelphia; vice presidents, Merrill Watson, New York, J. H. Fellows, Scranton, Pa., and A. Moensted, Milwaukee; section chairmen and vice presidents; streets, sidewalks and floors, W. W. Schouler, Newark, N. J.; reinforced concrete, C. S. Hall, Louisville; concrete blocks and cement products, M. S. Daniels, New York; art and architecture, Charles E. Watson, Toronto; testing of cement and cement products, E. S. Larned, Boston; machinery for cement users, W. W. Benson, New York; laws and ordinances, H. C. Henley, St. Louis; fireproofing and insurance, A. L. Johnson, St. Louis.

A NEW FLUE MACHINE.

The machine shown in the accompanying illustration was patented and is sold by Joseph T. Ryerson & Son, Chicago. It has for its object the rapid and efficient cleaning of locomotive boiler tubes, which has long been a difficult problem. The majority of shops in the country at present, use the drum rattler. The Ryerson machine is used in some of the principal railroad shops. Among those which may be mentioned are: the Montreal and Tacoma shops of the Northern Pacific and the Topeka shop of the Sante Fe. In all of these places it has given excellent satisfaction and has effected considerable saving both in the time and labor required to clean the flues. The machine consists of an overhead steel frame work, a concrete pit built below the floor of the shop and partially filled with water. Two wide faced, case-hardened, wrought iron chains forming continuous loops, in which the tubes roll over upon themselves as the chains are driven, are suspended from this frame work. To keep the tubes in position fenders are provided in the pit and are adjusted so as to accommodate flues varying from eight to twenty feet in length. The rear chain is supported by a traverse carriage which is moved toward or away from the front chain by a screw driven by a motor, thus adjusting the chains to the length of the flues handled. The flues may be raised or lowered by means of an idler over which the driving chains pass and which by raising and lowering correspondingly lengthen or shorten the suspended chains. This enables the tubes to be raised independently of the crane service of the shop. The gearing is overhead and is driven by a direct-connected twenty horsepower motor.

A small push car is on the tracks arranged on either side of the tank and the flues to be cleaned are pushed over to the pit by this car. They can then be lowered into the pit for removal of the dirt and the machine started. Five hundred 2*-inch tubes may be handled at one time and the length of the time required to place the tubes in position is about four minutes; the only labor necessary is to push the car in position. The actual time of rattling the tubes is about the same on this machine as in the barrel form of rattler, but since this machine will handle at one time five or six times as many flues as the former, the cost is reduced to less than four cents per hundred flues.

Another advantage of the present machine is the absence of noise, the rattler being down under the water. Thus the soot and dirt is washed from the inside of the tubes and at the same time the other material is scraped from the outside. The chains have a velocity of about 130 feet a minute.



GENERAL VIEW OF RYERSON FLUE CLEANING MACHINE.

A handy pocket diary has been issued by George G. Blackwell Sons & Co., Ltd., Liverpool, Eng., consisting of cover of red leather, fitted with a pocket for the carriage of money and stamps, and six books, which may be inserted in this cover. The books are arranged with numbered and dated pages for two consecutive months. It is an exceedingly handsome and useful article.

PRICES OF RAW MATERIALS.

The wide extent of the present period of unprecedented industrial activity, which has lifted the price level of iron, steel and their manufactured products with few exceptions to the highest point since early in 1903, is strikingly evidenced by corresponding advances in the prices of other raw materials entering into the manufacture of finished articles. In no line is this condition more strongly emphasized than in the production of machinery, agricultural implements and allied products, where in addition to higher prices for iron and steel the manufacturer is forced to secure practically all other raw materials at a largely increased cost. The demand for tin plate has boosted the price of pig tin almost 50 percent in a comparatively short period; copper prices have soared to unusual heights in the past three months; ingot brass quotations have almost doubled, steel shapes and malleable castings have shared in the heavy advance and even rivets and other small parts have kept pace with other requirements. If hardwood enters into a product it must be secured at rates which have increased one-third during the season and must be finished with turpentine at prices even further advanced. The manufacturer is also often forced to pay a handsome premium for anything like prompt delivery from hard-pressed producers. Naturally advanced prices on machinery, tools, agricultural implements and similar manufactures have been the result, but it is doubtful whether they have been commensurate with the steady advance of the raw materials.

NEW DESIGN OF "STILES" DROP.

The accompanying illustration shows the latest model of the "Stiles" friction roll forging drop hammer built by the E. W. Bliss Co., 8 Adams street, Brooklyn, N. Y. This hammer differs from former models mainly in the proportion of the parts and in the weight of the whole machine. They are built with 1,000 and 2,000 pound hammer heads, also in smaller sizes. The tendency is more and more to the use of heavier hammers and to do with one blow what heretofore has required several—pointing to increased economy and efficiency.

NEW "BLISS" DROP HAMMER.

In this drop the hammer is held up by clamps beneath the lifting rolls instead of the stop used in many hammers. The action of these clamps in holding the hammer securely, obviates entirely the side blow and shock which results from catching the hammer on a stop fastened to one of the uprights. This removes one of the principal causes of broken uprights and uneven wear of the guides.

The stroke of the hammer can be quickly changed to any point within the length of the upright by simply shifting the collar of the upright rod to the required position. The hammer can be almost instantly stopped on any point of the down stroke by letting go of the foot treadle. By depressing the foot treadle lightly the hammer can be made to descend as slowly as may be desired. This is a great convenience in setting dies and gives the operator complete control over the machine at all times. Variable blows can be given by working either hand or foot lever. The rebound can always be caught in the proper manner, whatever the thickness of the dies, by adjusting the lower collar on the upright rod to suit. By depressing the foot treadle and letting go of it after the blow is given, the hammer will automatically stop at the height from which it is set before. If continuous blows are desired it is only necessary to keep the treadle depressed. No treadle movement is required for each separate blow.

As will be noticed from the illustration, the hammer is very well proportioned, and particular attention is called to the extremely heavy anvil. This is a solid casting weighing 30,000 pounds, or fifteen times the weight of the steel hammer head. This ratio between the hammer head and the anvil is maintained throughout in all of the sizes of drops built with heavy anvils by the E. W. Bliss Co.

A NEW HOSE CONNECTOR.

The Pittsburg Hose Connector Co., Pittsburg, has just placed on the market a new device which will be of interest to all users of rubber hose. The

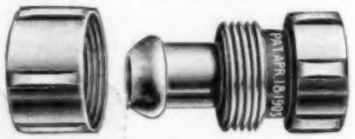


FIG. 1.—COMPONENT PARTS OF HOSE CONNECTOR.

hose connector is simple in construction and easy in operation, a twist of the fingers being all that is necessary to fasten it to the hose. It makes a

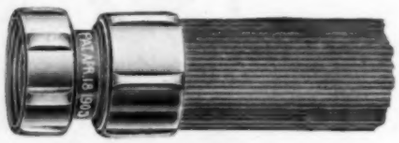


FIG. 2.—HOSE CONNECTOR ATTACHED TO HOSE.

good tight joint without the use of washers, clamps or bands and without the aid of tools.

It will supply a want in mills and factories where air, steam, water or gas is conducted through hose, and where

FIG. 3.—UNION FOR JOINING TWO HOSE.

a break in the hose or a leaky connection means the loss of valuable time in securing the tools necessary and making the repair in the usual way.

Fig. 1 shows the two parts of the connector, and Fig. 2 the parts joined and fastened to the hose end. Fig. 3 illustrates a union joining. This connector is made for all sizes of hose, it being necessary only to designate inside and outside diameters.

At Raudnitz, Bohemia, a large factory for building feed-cutting machines is being erected on American plans, and will make use of machinery and tools chiefly imported from the United States.

Southern Steel Securities Advance.

With call money plentiful at nominal rates and in the absence of any disquieting feature, the stock market maintained a consistent bouyancy and activity throughout the past week and totaled sales of 8,791,600 shares, an average of almost 1,500,000 daily. The sales of Friday slightly passed the 2,000,000 mark, the largest total for more than a year. The two market leaders, Union Pacific and Amalgamated Copper, furnished one-fourth of this total and were the basis of pronounced activity through the week, but industrial stocks, particularly iron, steel and allied securities were heavily dealt in and The greatest strength was manifested by the Southern iron and steel group. Tennessee Coal & Iron, though selling less than 40,000 shares, sold as high as 165 and closed the week at 160, a gain of more than 20 points over the close a week earlier. This stock enjoys the unique distinction of selling as a four per cent higher than United States Steel preferred which pays seven per cent. Steel preferred, were strong, the latter gaining a point and a half on sales of 150,000 shares. Some disappointment is expressed at their relatively slow advance in view of the uniformly favorable developments in the industry, but it is noticeable that what progress they are making is solid and steady, with little of the speculative flavor. They are enjoying more than their normal degree of activity with the prospect of its continuance for some time. Along with Tennessee Coal & Iron, advances were made by Republic Iron & Steel with a selling of over 140,000 shares, Colorado Fuel & Iron 135,000 shares. On the Pittsburg exchange, Crucible Steel was the basis of heavy operations on the strength of which it reached the highest level in its history. Pressed Steel Car, American Locomotive and American Car & Foundry made up another group which further reflected the busy condition of their branch of the industry by good advances.

Financial Notes.

Recent dividend declarations include the following: International Steam Pump Co., regular quarterly preferred, 1½ per cent payable Feb. 1; National Steel & Wire Co., regular quarterly preferred, 1¾ per cent payable Jan. 31; Harbison Walker Refractories Co., preferred 1½ per cent payable Jan. 20; United States Cast Iron Pipe & Foundry, regular quarterly preferred 1¾ per cent and common 1 per cent.

The statement of operation of the Susquehanna Iron & Steel Co., under the receivership from Dec. 1, 1903 to Dec. 1, 1905, shows the net amount of sales and earnings to have been $2,-lows; sales $29,346,567; total income $30,087,674; cost of manufacture and selling $24,129,218; dividends paid $2,-895,610; surplus after all deductions $3,-008,343; total surplus on hand Oct. 31 $12,577,540.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quotation Jan. 7	Closing Quo. Jan. 14	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend		
							Basis	Being Paid	Date Last Div. Dec.
Allis-Chalmers Co	23½	23⅛	— ⅜	Sept.	100	19,820,000		.....	....
Allis-Chalmers preferred	63	63¾	+ ¾		100	16,150,000	7 cum	.....	Feb., 1904
AmericanCan	10	10¼	+ ¼	Apr. 24	100	41,233,300		.....	....
AmericanCan preferred	69½	70¼	+ ½		100	41,233,300	7 cum	5 Q.	Jan., 1906
AmericanCar and Foundry	40¾	43⅝	+2⅞	June 28	100	30,000,000		.....	May, 1905
AmericanCar and Foundry preferred	100	100⅞	+ ⅞		100	30,000,000	7 n. c.	7 Q.	Jan., 1906
AmericanLocomotive	77¾	76¾	—1	Oct. 16	100	25,000,000		.....	
AmericanLocomotive preferred	117½	119⅝	+2⅛		100	24,100,000	7 cum	7 Q.	Jan., 1906
American Shipbuilding	57	56	—1	Oct. 2	100	7,000,000	4	4 Q.	Dec., 1905
American Shipbuilding preferred	103	104	+1		100	7,000,000	7 n. c.	7 Q.	Jan., 1906
American Steel Foundries	14½	14⅝	+ ⅛	Oct. 3	100	17,700,000		.....	
American Steel Foundries preferred	50⅝	50⅞	+ ¾		100	17,700,000	6 cum	.....	Aug., 1905
Barney & Smith	18	17	—1	June 5	100	1,000,000		.....	June, 1894
Barney & Smith preferred	125	123	—2		100	2,500,000	8 cum	8 Q.	Dec., 1903
Bethlehem Steel	32	31⅜	— ⅝	April 3	100	15,000,000		.....	
Bethlehem Steel preferred	89	90½	+1½		100	15,000,000	7 n. c.	7 Q.	Nov., 1905
Bullock Electric preferred	114	114	...	Oct. 2	100	1,000,000	6	6 Q.	Jan., 1906
Cambria Steel	31⅜	34⅛	+2¾	March 20	50	45,000,000	6	3 S. A.	Aug., 1905
Cambria Iron	50	49	—1		50	8,468,000	4	4 S. A.	Jan., 1906
Colorado Fuel & Iron	57½	60⅞	+3⅜	Oct. 15	100	30,132,000	7	.....	Apr., 1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	25	27	+2	May 31	100	6,098,000	5	.....	Nov., 1902
Crucible Steel	14	14¾	+ ¾	Oct. 17	100	25,000,000		.....	
Crucible Steel preferred	74	78¼	+4¼		100	25,000,000	7 cum	.....	Sept. 1903
Empire Steel	6	6	.....	Feb. 28	100	2,281,400		.....	
Empire Steel preferred	39	38	—1		100	2,500,000	6 cum	3 S. A.	Jan., 1905
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	5	5 Q.	Nov., 1905
Fay & Egan preferred	120	120	.....		100	1,000,000	7 cum	7 Q.	Nov., 1905
General Electric	179½	179⅛	— ⅜	May 8	100	48,256,050	8	8 Q.	Jan., 1906
International Pump	28	28	.....	June 5	100	12,262,500		2	July, 1905
International Pump preferred	80½	80½	+ ⅛		100	8,850,000	6 cum	6 Q.	Feb., 1906
Lackawanna Steel	81	81	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	18⅝	20	+1⅜	Oct. 3	100	40,000,000		.....	
Niles-Bement-Pond	121	121	.....	Feb. 7	100	5,000,000	6	6 Q.	Dec., 1905
Niles-Bement-Pond preferred	103⅝	103⅝	.....		100	2,000,000	6 cum	6 Q.	Nov., 1905
Otis Elevator Co	58	57	—1	March 19	100	6,350,300		2 A.	Apr., 1905
Otis Elevator Co. preferred	106	106	.....		100	5,589,500	6 n. c.	6 Q.	Jan., 1906
Pittsburg Coal Co	14¾	14⅞	+ ⅛	Feb. 12	100	30,135,000		.....	
Pittsburg Coal preferred	60	59	—1		100	30,716,200	7	.....	Apr., 1905
Pressed Steel Car	54⅞	57	+2⅛	Feb. 21	100	12,500,000		3	Aug., 1904
Pressed Steel Car preferred	100¾	100⅞	+ ⅛		100	12,500,000	7 n. c.	7 Q.	Nov., 1906
Pullman Palace Car	245	244	—1	Oct. 18	100	74,000,000		8 Q.	Nov., 1905
Railway Steel Spring	61¾	60⅛	—1⅝	March 1	100	13,500,000		4 S. A.	Oct., 1905
Railway Steel Spring preferred	103½	104	+ ⅜		100	13,500,000	7 cum	7 Q.	Dec., 1905
Republic Iron & Steel	33¾	37¼	+3½	Oct. 17	100	27,352,000		.....	
Republic Iron & Steel preferred	106½	107⅛	+ ⅝		100	20,852,000	7 cum	7 Q.	Jan., 1906
Sloss-Sheffield	88¾	93	+4¼	March 14	100	7,500,000	5	5	Jan., 1906
Sloss Sheffield preferred	105	105	.....		100	6,700,000	7 n. c.	7 Q.	Jan., 1906
Tennessee Coal & Iron	139½	160	+20½	May 15	100	22,552,800		4 Q.	Jan., 1906
U. S. Cast Iron Pipe & Foundry	51⅞	51⅝	+ ¼	June 27	100	12,500,000		2	Jan., 1906
U. S. Cast Iron Pipe & Foundry preferred	95	96	+1		100	12,500,000	7 n. c.	7	Feb., 1906
U. S. Steel	44⅜	44½	+ ⅛	April 16	100	508,302,500		.....	Dec., 1903
U. S. Steel preferred	108⅝	108¼	+1⅜		100	380,281,100	7 cum	7 Q.	Nov., 1905
U. S. Steel 5's	97	98	+1		100	463,798,000	5	5 A.	
Virginia Iron, Coal & Coke	50⅞	53¾	+3	Sept. 18	100	8,641,600		.....	
Westinghouse Electric	174½	174⅛	— ⅜	June 27	50	20,996,350	10	10 Q.	Jan., 1905
Westinghouse Air Brake	152	150	—2	Oct. 2	50	10,990,450	20	20 Q.	Jan., 1900

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Jaeger Machine Co., Columbus, O., has been incorporated by Gebhard Jaeger, John Miller, C. H. Beahr, W. H. Peters and F. A. Miller, with a capital of $25,000.

The La Salle Machine & Tool Co., La Salle, Ill., has been incorporated with a capital of $20,000 to deal in machinery. The incorporators are: F. W. Matthiessen Sr., E. Roth and G. P. Blow.

The Doehler & Beakbane Mfg. Co., Brooklyn, N. Y., has been incorporated to cast metals and machine parts with a capitalization of $20,000. The incorporators are: Herman H. Doehler, 817 Eastern Parkway; James Beakbane, 302 Pearl street, Brooklyn; Samuel F. Chappell, 135 Elmendorf street, Kingston, N. Y.

The Acme Ornamental Iron Works, New York, has been incorporated to manufacture iron and other metals with a capital stock of $5,000. The incorporators are: Moses S. Shill, 2 West 117th street; Herman S. Goldenberg, 124 East 113th street; and Barnet Schacht, 16 East 107th street, all of New York.

B. M. Jones & Co., Boston, has been incorporated to deal in iron and steel with a capital of $125,000. The officers are: President, B. M. Jones, 141 Milk street; treasurer and clerk, W. J. Klein, 141 Milk street, both of Boston.

The Crandall Inventions Co., Lynn, Mass., has been incorporated to deal in patents with a capital stock of $50,000. The officers are: President, H. E. Crandall, 68 Union street; treasurer, J. L. McManus, 125 Oxford street; and clerk, G. R. Jagoe, all of Lynn, Mass

The Interstate Machinery & Supply Co., Wilmington, N. C., has been incorporated with an authorized capital of $50,000. The company will carry a large stock of machinery and mill supplies. The officers of the company are: T. D. Love, president and treasurer; T. J. Pratt, general manager; Dr. H. E. Covington, of Cerro Gordo, N. C., vice president; and B. W. Covington, also of Cerro Gordo, secretary.

The Palmer Davis Joint Rail Co., Huron, S. Dak., has been incorporated with $250,000 capital stock.

The M. L. Oberdorfer Brass Co., Syracuse, N. Y., has been incorporated to manufacture iron, steel, brass, etc., with a capital stock of $50,000. The incorporators are: Moses L., Jesse L. and Jonas L. Oberdorfer, all of Syracuse.

Robert J. Masbach, New York, has incorporated to manufacture and deal in hardware, etc., with a capital of $25,000. The incorporators are: Robert J. Masbach, 117 Chambers street; Emil Heller, 459 West Fourteenth street; and Fred W. Zuck, 80 Vesey street, all of New York.

The Buda Foundry & Mfg. Co., Harvey, Ill., has increased its capital stock from $300,000 to $500,000.

The Wilmington Iron Co., Wilmington, Del., has been incorporated to manufacture and deal in iron, steel and metal products with a capital stock of $250,000.

The Jumbo Automatic Machine Co., New York, has been incorporated with a capital of $10,000 by J. E. Griffin, T. C. Short and Edward Cunningham, New York.

The Standard Wire Co., New Castle, Pa., has been incorporated with $60,000 capital stock. The directors are: Jonas Kaufman, John E. Norris and C. F. Wheeler, New Castle.

The North Lebanon Foundry Co., Lebanon, Pa., has been incorporated with a capital stock of $10,000. The incorporators: Samuel P. Rank, A. Wesley Patchkin, John H. Walborn, Elmer P. Kreider, John C. Brightbill, of Lancaster, and Samuel Gingrich, of Harrisburg.

The New England Shoe Repairing Machinery Co., Boston, has been incorporated to deal in shoe repairing machinery. The capital stock is $300,000 and the officers are: President, Norman J. MacGaffin; treasurer, A. Moriarty; and clerk, Norman J. MacGaffin, all of 711 Tremont Bldg., Boston.

The Southwestern Mfg. Co., Portland, Me., has been incorporated to manufacture and deal in forgings, machinery, tools, etc., with $10,000 capital stock. The officers are: President, Millard W. Baldwin, and treasurer, Jas. J. Hernan, both of Portland.

The Western Wire Goods Co., Buffalo, has been incorporated to manufacture wire goods with a capitalization of $25,000. The directors are: C. E. Watterlaufer, G. C. Finley and A. K. Finley, all of Buffalo.

The Hayden Machinery Co. has been incorporated in Maine with a capital of $750,000 to manufacture machinery. The officers are: President, T. C. Powell, Boston; treasurer, A. Chapman, Portland; and clerk, I. W. Dyer, Portland.

The Southern Iron & Equipment Co. has been incorporated at Atlanta, Ga., with a capitalization of $300,000 with the privilege of increasing it to $1,000,000.

The Adamite Surface Machine Co., New York, has been incorporated to manufacture grinding and polishing machinery, etc., with a capital of $25,000. The incorporators are: Ralph F. Roberts, 215 West Twenty-third street; Hugh L. McLees, 400 West Fifty-seventh street, New York; and Charles F. Hickey, 153 Division avenue, Brooklyn.

The H. F. Livermore Co., Brookline, Mass., has been organized with $50,000 capital stock by Homer F. Livermore who will be president and treasurer.

The Frazer Machine Co., Dorchester, Mass., has been incorporated to deal in machines, tools, etc., with a capital of $12,000. The president and treasurer is Warren F. Fraser.

The Orient Spray Co., East Weymouth, Mass., has been incorporated to manufacture "Orient Spray" machinery etc., with a capital of $250,000. The president and treasurer is Wilton E. Drake.

The New York Can Mfg. Co., Manhattan, N. Y., has been incorporated to manufacture tin cans and boxes, with a capitalization of $5,000. The directors are: Henry R. Berlinicke, Harry C. Adams, both of New York, and John M. Nolan, Paterson, N. J.

The Rolen Foundry & Mfg. Co., Manhattan, N. Y., has been incorporated to manufacture brass finishings, brass goods, etc., with a capital of $2,500. The directors are: H. W. A. Lehnert, George J. Rohman, and Andrew Lehnert, Brooklyn.

The Mohr Specialty Co., Manhattan, N. Y., has been incorporated to manufacture hardware, tools, cutlery, etc, with a capital stock of $25,000. The directors are: William L. Mohr, John F. Holiday, New York; and John M. Nolan, Paterson, N. J.

The Duke Success Machinery Co., Memphis, Tenn., has been incorporated by F. H. Reid, E. E. Merry, Joseph Townsend, T. L. LeMalta and J. G. Duke. The capital stock is $50,000. The new company will absorb the J. G. Duke Machine Works. F. H. Reid will be president; J. G. Duke, vice president; E. B. Merry, treasurer; J. Townsend, secretary, and Thomas L. LeMalta, manager.

The Maryland Coal Co., Birmingham, Ala., has incorporated with $200,000 capital stock to mine coal and manufacture coke. Calvin Gillis is president and John London secretary.

The Winfield Iron Works, Stamps, Ark., has been chartered with a $15,000 capitalization by Robert Buchanan, T. D. Musgrave, T. A. Brown and others.

The Edgewood Coal & Coke Co., Middlesboro, Ky., is being organized by W. C. Sleet and associates for the development of 600 acres of coal land in the vicinity of that city.

The Bicknell Manufacturing & Supply Co., Janesville, Wis., has been incorporated for $25,000 by H. S. Bicknell of Janesville, and R. C. Bicknell and A. E. Aspinwall of Ft. Atkinson, to manufacture hand and power wood and iron-working machinery, mill and farmers' supplies.

The Keystone Land & Coal Co., Charleston, W. Va., has incorporated with a capitalization of $1,000,000 to mine coal and manufacture coke in developing properties recently acquired in the Paint Creek district. E. P. Mucklow is interested.

The Fairmont Mining Co., Fairmont, W. Va., has incorporated for $100,000 to manufacture mining machinery, mine cars, tipples, etc. The incorporators are M. E. Ashcraft, Geo. H. Brobst, C. D. Flaming, F. M. Wilson and C. L. Merrifield.

The Harris Machinery Co., Minneapolis, Minn., has been incorporated with a capital stock of $100,000. The company, which was formerly a copartnership, deals in and repairs engines, boilers and machinery of all kinds, carrying a large stock of second-hand equipment. The officers are: Bernhard S. Harris, president; Marks Harris, vice president and Arthur M. Harris, secretary and treasurer.

New Construction.

The buildings which the American Shipbuilding Co. is erecting at Bay City, Mich., to replace those recently destroyed by fire, will be practically double the size of those burned. The main structure will be 88 x 250 feet and the building over the furnace 56 x 112 feet. The contract calls for their completion in record time. The machinery which went through the fire is all in good condition.

Ground has been broken for an addition, 63 x 66 feet, to the foundry of the Hendley Machine Co., Hartford, Conn.

The Peerless Seat & Tank Co., Evansville, Ind., recently incorporated for $100,000, has almost completed a three-story brick building 150 x 242 feet. The company will manufacture pottery fixtures and brass work, iron work and pipe for plumbing and fitting.

George A. Mesker, Evansville, Ind., is building an additional two stories, 150 x 180 feet, to his foundry at a cost of $75,000. It is of brick and steel construction.

The Belle City Malleable Iron Co., Racine, Wis., has completed a molding and enameling room 60 x 120 feet and is said to be considering the practical rebuilding of its entire plant.

Kelley, Maus & Co., 3 West Lake St., Chicago, are negotiating for a site upon which they are planning the erection of a large warehouse to which their iron and steel business will be moved.

The National Enameling & Stamping Co., Granite City, Ill., is reported as planning the erection of a large tin plate plant at that place. An open-hearth plant 182 x 452 feet, a universal mill 81 x 290 feet, a rolling mill and a tinnery are among the buildings contemplated. Fred G. Niedringhaus, St. Louis, is interested.

The Western Machine & Tool Works has plans prepared for a foundry to be operated in connection with its present plant at Holland, Mich.

The Coosa Pipe & Fdy. Co., Gadsden, Ala., is to erect an additional pipe foundry building 80 x 200 feet. Ten pipe floors are now operating, seven more will be added March 1, and three more June 1. The present daily capacity of 20 tons of finished product will be increased to 40 tons by May and probably to 100 tons by the close of the year.

C. E. James of Chattanooga is interested in a company now organizing to build blast furnaces and a steel plant at that city. The organization is not yet completed but has proceeded so far that a site of 100 acres has been purchased. The plan is to erect blast furnaces with a daily capacity of 200 tons and steel works and rolling mills with a daily capacity of 200 tons of finished products. The plant will have its own ore, coal and coke. It is expected to cost in the neighborhood of $1,500,000.

The Enterprise Wire Works of Baltimore has let the contract for a building 46 x 155 feet to E. C. Lawrence of that city.

The Montford Machine Casting Co., Baltimore, is soon to let the contract for additions to its plant which will include one large structure and a small engine and blowing room.

The Hartford Machine Screw Co., Hartford, Conn., will erect a large one-story building for general manufacturing purposes.

The Ohio Central Railroad has prepared plans for a repair shop, 35 x 400 feet, and a boiler shop 50 x 102 feet, to be erected in the near future at Bucyrus, O.

The Waterman Car & Wheel Foundry Co., mention of whose incorporation was made in our issue of Dec. 28, is in the market for an entire equipment of machinery for a modern plant. A site has been secured along the Missouri, Kansas & Texas Railroad where work will be commenced immediately on the main building, 100 x 235 feet to contain eight wheel floors of 25 wheels each. A power plant, core rooms and ovens will also be constructed. The new company will manufacture cast iron chilled car and engine wheels and will probably commence operations about April 15.

The Meriden Fire Arms Co., Meriden, Conn., will erect a one-story machine shop 40 x 200 feet. The erection of a power plant for which engines and boilers will be required is contemplated.

The Harlan & Hollingsworth Corporation, Wilmington, Del., has awarded the contract for its car shops to Tatnall, Brown, & Co., of Wilmington. The shops will be one story high, with lantern, round house type of construction with a capacity of 15 80-foot cars. A two-story store house 40 x 48 feet will also be erected.

The Titusville Forge Co., Titusville, Pa., manufacturer of iron and steel forgings, is erecting a structural steel and brick addition to its machine shop. The building will be 84 x 190 feet and will be equipped with a 25-ton electric traveling crane, the contract for which has already been placed. The officers of the company are: J. F. Dillon, president; B. F. Kraffert, vice president, and Willis E. Fertig, secretary and treasurer.

General Industrial Notes.

The MacPhail Molding Machine Co., Davenport, Ia., recently incorporated, is to manufacture under molding machine patents applied for by James MacPhail. It will build various types of foundry molding machines, including standard stripper plate construction, a new automatic Rockover machine and squeezers operated by air power, belt power and manually. The company will shortly be in a position to furnish any equipment desired in the way of mechanical molding apparatus or metal patterns.

The Brown-Lipe Gear Co., recently incorporated at Syracuse, N. Y., merely continues the business heretofore carried on under a partnership. There is no change in officers.

F. E. Myers & Bros., Ashland, O., have purchased the hay-rack clamp business of the Wenzelmann Mfg. Co., Galesburg, Ill., the sale including patents, patterns, prints and stock of materials for hay rack brackets and clamps.

Joseph E. Thropp Jr., Jan. 1 assumed an interest in the business heretofore conducted solely by Joseph E. Thropp and became general manager of the blast furnace at Earlston near Everett, Bradford Co., Pa. The Earlston furnace, heretofore called the Everett Furnace, has an annual capacity of 75,000 tons annually of high grade forge and foundry iron. It is supplied with coke from the Kearney Coal & Coke Works, Kearney, Pa., with limestone from the Hill Top Quarry near the furnace and with a considerable part of its iron ore from mines in Bedford County, Pa., and Jefferson and other counties in West Virginia, all properties of Mr. Thropp.

Joseph A. Silver and his son, James W. Silver, have purchased the interests of John A. Silver and Hyrum A. Silver in the Silver Bros. Iron Works Co., Salt Lake City. The concern originated as a small machine shop in 1864 and has developed into an extensive plant for the manufacture of mining supplies and machinery, besides machine, foundry, blacksmith and boiler shops.

The Killian Fire Brick Co., Charleston, S. C., a recent corporation, will mine fire clay and operate a fire brick plant with a capacity of 30,000 brick per day. T. M. Waring is president and H. F. Hayne vice president, both with headquarters at Charleston. Thos. F. Davis is superintendent in charge of the plant at Killian.

The blooming mill department of the Ensley Steel Works of the Tennessee Coal, Iron & Railroad Co., establish a new record Jan. 4 when it turned out 223 ingots. The December production of the steel mill also passes all previous high marks, being near 24,500 tons.

By the recent dissolution of a restraining order, the Steel Highway Track Construction Co. can carry out its plans of laying double-track seven inch steel bands for a distance of a mile on the Bardstown pike near Louisville, Ky., to provide a smooth surface for heavy wagon traffic.

Negotiations are under way, it is reported with prospects of success, for the merging of the Baltimore Shipbuilding & Dry-Dock Co. and the William Skinner & Sons Shipbuilding & Dry-Dock Co., both of Baltimore.

The Chattanooga Iron & Coal Co., recently incorporated for $500,000, will acquire the 200-ton furnace of the Chattanooga Blast Furnace Co., and operate it in connection with coal lands purchased near Dunlap, Tenn., and iron ore properties in northern Georgia. C. E. Buck of Birmingham is to be at the head of the new concern and the main office will be in Birmingham.

The Astoria Steel Foundry Co., with Walter H. Storm in charge, has leased the wooden building of the Astoria Steel Plant, Astoria, L. I., which will be used to manufacture steel castings. At first only risers, treads and posts will be cast, but it is the intention of the company to run the foundry entirely with molding machines melting on an average of about 12 tons for the first six months.

Trade Notes.

The Van Dorn Iron Works Co., Cleveland, has received the contract for the iron and steel work on the forge and machine shop, 45 x 200 feet, to be erected for J. Dyson & Son on the site of their plant at Cleveland recently destroyed by fire. It will also supply the structural material for the Fairbanks office building, Springfield, O. This structure is eventually to be eight stories in height, but for the present only three stories will be erected under a rush contract.

The National-Acme Mfg. Co., Cleveland, in order better to serve a constantly increasing trade in the middle and northwestern states, at an early date will open a warehouse in Chicago where a complete stock of set and cap screws and kindred goods will be carried.

Milliken Bros., 11 Broadway, New York, announce that in connection with their new open-hearth steel plant and rolling mill on Staten Island contracts have been let to the Westinghouse Co. for the electric generators, to the C. & G. Cooper Co. of Mt. Vernon, O., for the engines to operate the electric power plant, and to the United Machinery & Fdy. Co., Pittsburg, and the Morgan Engineering Co., Alliance, O., for the table work in connection with the rolling mills. Work is progressing on the foundations of the plant.

The Detroit plant of the American Shipbuilding Co. is to build a steel excursion boat with a capacity of 2,700 passengers for the Detroit, Belle Isle & Windsor Ferry Co. She will come out July 1.

The Golden Key Mining Co., Hillside, Ariz., is installing a power plant to operate its mining machinery and has contracted with the De La Vergne Machine Co., New York, for two "Hornsby-Arroyd" oil engines each of sixteen horsepower.

The Robins Conveying Belt Co., New York, has recently opened an office at 749 Railway Exchange Bldg., Chicago, in charge of C. Kemble Baldwin, chief engineer of the company. He will handle all inquiries from the middle west.

James Bonar & Co., Inc., Pittsburg, have received a contract for the installation of three complete automatic Bonar oiling systems for the Mingo plant of the United States Steel Corporation at Mingo Junction, O. The systems are applied to eight double-cross compound vertical engines of the Allis, Southwark and Mesta types and three cross compound horizontal engines of the Buckeye make. The Bonar system has already been installed at a number of Steel Corporation plants.

The Westinghouse Machine Co. will install a 1000 horsepower turbine on the B. & O. docks at Lorain, O., to permit of the loading of ore by night.

The Mesta Machine Co. booked an order through its New York office, for supplying the Passaic Steel Co., Paterson, N. J., with all its cast steel rolls, rolling wheel pinions, coupling boxes and spindles during 1906.

John F. Allen, 370-372 Gerard Avenue New York, reports sales of the "Allen" riveters during December as follows: American Car & Foundry Co., three; Scully Steel & Iron Co., three; Berger-Carter Co., two; Mitsui & Co., two; Snare & Trieste, one; Pettibone, Mulliken Co., one; Buffalo Brake Beam Co., one; Schreiber & Sons Co., one.

Fires.

Fire at Shenango Furnace No. 3, Sharpsville, Pa., Jan. 4 destroyed the old laboratory of the Spearman Iron Co., recently used as a storehouse. The loss does not exceed $1,000.

Fire which was started by an explosion in the ten-inch finishing department of the old mill at the Greenville, Pa., plant of the Carnegie Steel Co. Jan. 11 practically destroyed the works with the exception of the office, hospital and stock rooms. The engines, rolls and foundations were not badly injured, however, and the loss may not exceed $400,000 or $500,000. The explosion scattered pieces of hot metal into the roof of the finishing mill and a strong wind drove the flames into the new tandem rolling mill, completed only last July, the boiler house and the puddling department. The mill had been running very satisfactorily on high grade products and employed 400 men. It was valued at $1,000,000 before the addition of the tandem mill. It is reported that plans are being drawn for its rebuilding.